Philadelphia Building Code and Building Trade Directory

1928 EDITION

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THE
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OF
PHILADELPHIA.
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HENRY J. MAGAZINER

MAGAZINER, EBERHARD & HARRIS
ARCHITECTS
1701 Walnut Street, Philadelphia

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ARCHITECTS
1701 Walnut Street, Philadelphia
HENRY J. MAGAZINER

Philadelphia Building Code

and

Building Trade Directory

A Codification of the

LAWS, ORDINANCES, RULES AND REGULATIONS

Governing

BUILDING CONSTRUCTION

IN PHILADELPHIA, PENNA.

Together with a condensed and selected list of those in position to supply

MATERIAL, EQUIPMENT AND SERVICE

Entering into Building Construction in Philadelphia, Penna.

Codified and Arranged by
M. S. GRAVER, 1927

PUBLISHED BY

JOHN D. CARDINELL

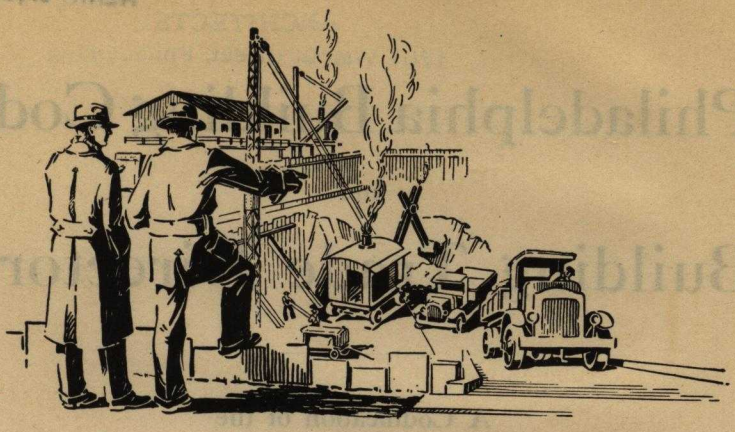
President

Cardinell-Vellum Mfg. Co., Inc.

Montclair, New Jersey

317 Washington Square Building

Philadelphia, Pa.



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FOREWORD

THIS codification of the Laws, Ordinances, Rules and Regulations governing building construction in Philadelphia, completely indexed for quick reference, should prove a great convenience to those who are most concerned.

The large number of Laws, Ordinances, Rules and Regulations, and the fact that they are issued from many bureaus, departments and other sources, has been a source of great inconvenience particularly to the architects, the engineers, the builders and the contractors of Philadelphia.

It is for their benefit, particularly, that this codification has been arranged, and it is the expectation of the publisher to bring out new and revised editions of this book from time to time as radical changes in, or additions to, the Laws and Regulations are made.

The Publisher and the Director of Codification hereby extend their thanks to all who assisted toward the publishing of this greatly-needed work, particularly the advertisers, whose support assured its publication, and it is hoped that the users of the book will consider these advertisers when buying, or specifying, building material or equipment.

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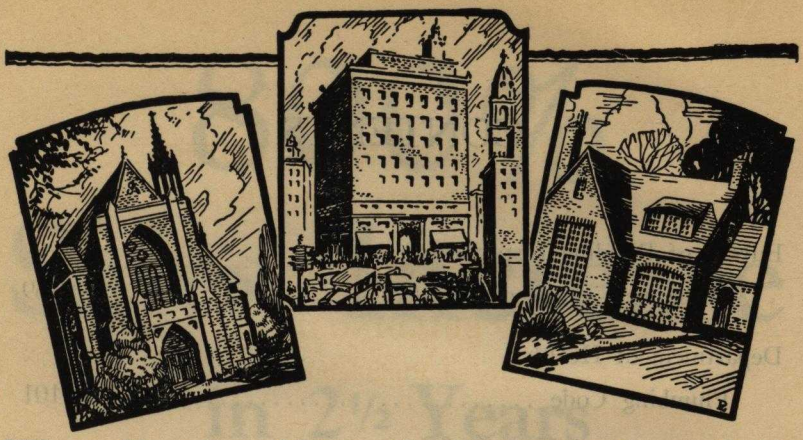
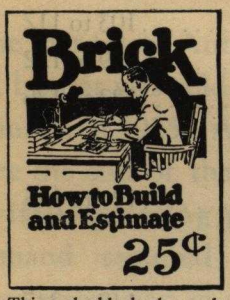


Where You Can Obtain the Best Kiln-Burnt Brick



This valuable book on the use and handling of real kiln-burnt brick contains facts, figures and illustrations that you will find intensely interesting.

The Philadelphia Members of The Common Brick Manufacturers' Association are able collectively to render much greater service to architects, contractors and prospective home owners than it would be possible for any one firm to render alone.

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LAWS, ORDINANCES, RULES AND REGULATIONS

Enforceable by the

BUREAU OF BUILDING INSPECTION

City of Philadelphia

All persons presenting plans for building improvements to the Bureau of Building Inspection, which approach street, party or alley lines, must produce evidence of having secured a survey before permit is issued.

The approval of the Art Jury is required on all plans for building improvements fronting on any park, parkway or boulevard, or falling within 200 feet of the lines of such park, parkway or boulevard.

All plans for improvements showing encroachments over the street line of any park, parkway or boulevard must be approved by the Fairmount Park Commissioners.

All other encroachments beyond the building line of the highways, such as steps, cellar doors, areaways, railings, bulks, bay-windows, porches, terraces or basement garages, which necessitate a depression of the sidewalk, etc., are referred to the Bureau of Highways for its approval.

The Electrical Bureau is required to approve all plans for electric signs, theatres and moving-picture buildings.

All plans for buildings to be used for the manufacture or storage of explosive or inflammable materials, including garages, must first be approved by the Fire Marshal.

Plans for bake shops must be referred to the Department of Labor and Industry for their approval.

The approval of the Division of Housing and Sanitation of the Bureau of Health must first be obtained on plans for all the following types of buildings:

Tenement houses.
All dwellings.
Two-family houses.
Lodging houses.
Rooming houses.
Apartment houses.
Servants' or janitors' quarters in cellars or basements.
Hotels.
Stables for horses and other live animals.
Slaughter houses (meat and poultry) and buildings for the storage of meats.
Rag shops.
Junk shops.
Bone-boiling establishments.
Fat-rendering establishments.
Fertilizer plants.
Chemical plants.

And any other manufacturing plants likely to produce obnoxious odors or annoyances.

All applications for permits for the erection or alteration of buildings must be accompanied by one set of white prints and one set of blue prints.

DWELLINGS

FOUNDATIONS

Foundations of dwellings supporting concentrated loads must be laid in cement mortar.

Foundation walls of dwellings must start 6 inches below cellar bottom; other buildings 12 inches bellow cellar bottom.

Sand must be standard sand, Jersey gravel or equivalent.

BRICK AND BATTLEMENT WALLS

All brick walls shall be carried up to the under side of the roof planking. This may be omitted from front bay-windows in dwellings.

Battlement walls of dwellings may have the roofing paper entered 2 inches on either side, and the battlement be laid in hard brick and cement mortar or covered with tin or tile.

CELLAR—WHEN NOT REQUIRED

Additions to existing dwelling houses, of the size of 14 feet or less, will not be required to have a cellar, provided a 3-foot air space exists between the under side of the joists and the ground, or cement floor.

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RANGES AND GAS GRATES

Ranges set 6 inches or less from partitions will require that such partitions be of brick; if set 12 inches from partitions they shall be covered with slate or metal with 1-inch air space.

All gas grates must be installed on concrete hearths and set in a brick pocket.

IRON BEAMS OVER BULK WINDOWS

Dwellings having stores in part of the first story need not have the iron beams over the bulk windows fire-proofed.

OPEN YARD SPACE

An alley cannot be counted as yard room in providing the necessary 144 square feet of yard required by the Act of Assembly.

If a garage is part of a dwelling, the 144 square feet of open space may be in the rear of the garage.

GENERAL

THICKNESS OF WALLS AND PIERS

In one-story buildings with solid division walls, the division walls shall be of legal thickness for party walls and be provided with a legal battlement.

Concentrated loads on 26 foot spans or less to have 13-inch walls and 4-inch pilasters. Add 4 inches additional to pilasters for every 13 feet or fraction thereof that the span is over 26 feet.

Pilasters to have a width of 8 inches plus 1-10 of the distance, center to center, of pilasters.

No 13-inch wall to be over 22 feet in height between brick pilasters or 30 feet in height between steel or concrete columns designed to take bending from wind.

Maximum distance between pilasters 18 feet for 13-inch walls, 24 feet for 18-inch walls and 32 feet for 22-inch walls. Provided 13-inch walls with 4-inch pilaster are not over 18 feet high.

Loads on the brickwork to be within the allowable as set forth in the law.

The effective area to carry the load equals the thickness of the wall through the pilaster times the width of the pilaster.

All walls having 13-inch pilasters or over shall be considered as having the proper piers or buttresses for lengths of buildings over 125 feet.

Where openings in walls exceed 50 per cent. of the length of the wall, center to center of piers, in third and second class construction, the piers shall have a width of at least 30 per cent. of the distance center to center of piers, with a thickness of at least 18 inches in upper story, increasing 4 inches in addition for every two stories in height. Provided, that pier may be of a lesser width if the same number of square inches are provided in the cross section of the pier and no pier to be of a lesser thickness than 18 inches. The brickwork in no case to be stressed in excess of the allowable as set forth in the Act of Assembly. For spans exceeding 26 feet in width 4 inches shall be added for every 13 feet or fraction thereof in excess of 26 feet.

Non-bearing piers may be 18 inches in two uppermost stories increasing 4 inches in thickness for every two additional stories. These rules apply to walls irrespective of length.

REINFORCED CONCRETE CONSTRUCTION

Self-centering, such as channel lath "hyrib," and similar material shall not be considered as furnishing section to take tension in reinforced concrete slab.

No slab in flat slab construction is to be less than 6 inches in thickness.

The allowable pressure upon filled ground is 1000 pounds per square foot. To obtain a greater value than this a physical test must be made on the soil to determine its carrying capacity.

Footings of buildings of first class construction having exterior curtain walls must be set back 6½ inches from party line.

Exit doors of factories, office buildings, and buildings used for public assembly, stores, etc., must open outwardly.

Heavy beams resting on shelf angles, the angles must be riveted to the beam. Where joist construction is supported on shelf angles, the angles may be bolted to the beam. Where wooden battens are bolted to the beams to support joist construction, the battens must also be supported from the lower flange of the beam.

Roof trusses shall be provided with necessary lateral bracing other than that furnished by the roof rafters.

All lintels supporting stone or brick over eight feet span must be fire-proof.

Mansard roofs must slope at least 1½ inches per foot and be covered with metal or other hard incombustible material.

Bay-windows will be allowed as follows: One up to 25 feet of frontage, two to 38 feet of frontage, three to 63 feet of frontage and four to 88 feet of frontage. To be classed as bay-windows they must project at least 12 inches.

Bay-windows must be smaller than the room and in no case exceed 15 feet.

Hotel ranges shall be set upon a floor of fire-proof construction.

Applications for permits for the erection of signs will not be considered if the signs project more than 12 inches from the building line unless approved by the Art Jury.

In figuring the allowable reductions of live loads on columns and foundations in buildings with the formula set forth in the building laws, the minimum loads for all columns and foundations shall in no case be less than the full dead load plus 50 per cent. of the full live load.

The top coat of cement mortar applied to slabs will not be considered in the thickness of the slab as furnishing depth or available section.

The available section to resist punching shear equals the width of the section times the depth from the top of the slab to the rods.

The limiting span for composite floors constructed of concrete 2½ inches in thickness is 36 inches.

MISCELLANEOUS

Buildings hereafter erected over four stories in height, having roof gardens thereon, must be of fire-proof construction.

Buildings constructed of iron frame covered with iron or wire lath and cement plaster are allowed, provided they do not exceed one story in height.

All cooling towers and tank enclosures must be of incombustible material.

REQUIREMENTS FOR PLANS

After June 1, 1925, all architects, engineers or owners submitting plans to the Bureau of Building Inspection for the erection or alteration of buildings will be required to clearly show on such plans the following information:

Exact location—name of street or streets and number on street if given.

The location of all street and party lines as well as the lines of the building in relation to such street and party lines.

Meridian line.

Names of owner and architect or engineer.

Gross area of the building.

The grade of building.

All fire walls and fire doors.

All stairs and fire towers.

All elevator enclosures.

The lay-out of sprinkler and standpipe equipment.

No alterations of existing plans are to be made in the office. Where plans are presented which do not conform to our laws and regulations, such corrections may be indicated, but the applicant will be obliged to have new plans drawn showing such corrections clearly.

AN ORDINANCE

Requiring the installation of sprinkler systems in the basements of buildings hereafter erected or altered to be used for stores, factories or warehouses, prescribing the kind and character of such sprinkler systems and providing penalties for the violation hereof.

Section 1. The Council of the City of Philadelphia ordains, That in the basements and sub-basements of all buildings hereafter erected or altered to be used for stores, factories or warehouses (except buildings of less than one thousand five hundred square feet in first or grade floor area) there shall be installed sprinkler systems of the kind and character as hereinafter provided.

Section 2. Definition of Automatic Sprinkler Systems. Automatic extinguisher systems shall consist of a system of piping connected to one or more acceptable sources of water supply or other fire extinguishing medium, provided with distributing devices so arranged and located as to discharge and diffuse automatically under the action of heat, an effective stream or spray over every part of the basement and/or sub-basement area as required under this ordinance.

Section 3. For the purpose of these rules, sprinkler systems shall be classified as follows:

(a) Automatic wet pipe systems, in which all pipes and sprinkler heads are at all times filled with water or other fire extinguishing medium.

(b) Automatic dry pipe systems, in which the pipes and sprinkler heads are filled with compressed air and the water supply is operated by an approved dry pipe valve.

Section 4. Approved Devices. As defined under this ordinance shall consist of automatic sprinklers and accessories approved by the Chief of the Bureau of Building Inspection and the Chief of the Bureau of Fire. The piping system being proportioned and the sprinklers spaced and installed in accordance with the standard practices for such work.

Section 5. Water Supplies. Such sprinkler system shall be supplied by direct connection from the public water system or other supply approved by the Chief of the Bureau of Building Inspection, and a single or double steamer connection of City Fire Department standard, with check valve and to be clearly marked "Sprinkler Connection."

Section 6. Before proceeding with the erection or alteration of any building (except building of less than one thousand five hundred square feet area) to be used for a store, factory or warehouse, the owner or his agent shall submit for approval to the Chief of the Bureau of Building Inspection detailed plans or diagrams showing the location and size of all pipes; the location of all sprinkler heads and valves controlling supply and a detailed description of the method of supply to the sprinkler system and such additional plans and specifications as the Chief of the said Bureau may require.

Section 7. Any person, owner or lessee who shall hereafter make any alterations or changes in construction or any building to be used as a store, factory or warehouse in violation of any of the provisions of this ordinance or shall have become the owner thereof after the same has been so done and shall omit, neglect or refuse to comply with the provisions of this ordinance shall forfeit and pay for such offense the sum of seventy-five (75) dollars and the further sum of fifty (50) dollars for each period of one month for which the said violation shall continue, to be recovered as penalties of like amount are or hereafter shall be recoverable in the name and for the use of the City of Philadelphia, and when collected the same shall be paid into the Treasury thereof.

Approved the tenth day of July, A. D. 1924.

W. FREELAND KENDRICK
Mayor of Philadelphia

AN ORDINANCE

Providing for the installation of standpipes in all buildings hereafter erected or altered of eighty-five feet or six stories or more in height, prescribing the kind and character of such standpipes and providing penalties for the violation hereof.

Section 1. The Council of the City of Philadelphia ordains, That for the better fire protection in all buildings hereafter erected or altered in the City of Philadelphia of eighty-five feet or six stories or more in height there shall be installed standpipes of the kind and character hereinafter provided.

Section 2. All such standpipes shall:

(a) be not less than four inches in diameter and of such additional diameter as may be necessary to supply one outlet of the size and construction of the standard City Fire Department hose outlets with hose valve on each and every floor of the building, the standpipe extending through roof with an approved hose outlet or monitor nozzle attached;

(b) be located at point in or near each main stairway or stairway tower of such buildings;

(c) have attached at a point convenient above the sidewalk outside of the building suitable steamer connections, with check valve, of standard City Fire Department size and construction, so that connections can be made to such standpipes with City Fire Department hose and City water supply either from City fire engine or high-pressure hydrant where available and to be clearly marked "Standpipe Connection."

Section 3. Water Supply. When, in the opinion of the Chief Engineer of the Bureau of Fire, a wet pipe system is necessary, the water supply shall be by direct connection to the public water system (where the pressure is sufficient) or from an elevated tank of not less than five thousand gallons capacity located at an elevation above the highest hose connection at a point to be determined by the Chief of the Bureau of Fire, or by an approved fire pump of a rated capacity of not less than five hundred gallons per minute. Steamer connections are required to all standpipes (see paragraph (c), Section 2).

You'll find the Classified Building Trade Directory, toward the end of the book, a great convenience. Use it.

In addition to the Fire Department hose outlet above specified one one-and-one-half-inch hose outlet with suitable valve may be provided at each floor with one-and-one-half-inch linen hose attached.

Section 4. Before proceeding with the erection or alteration of any building of eighty-five feet or six stories or more in height, the owner or his agent shall submit for approval to the Chief of the Bureau of Building Inspection and the Chief Engineer of the Fire Department, detailed plans or diagrams showing the location of the standpipes in the building, the size thereof, the number and character of hose outlets and valves and the character of interior water supply from tank or pump and such additional plans and specifications as the chiefs of the bureaus of the above departments may require.

Section 5. Any person, owner or lessee who shall hereafter make any alterations or changes in construction of any building eighty-five feet or six stories or more in height in violation of any of the provisions of this ordinance or who shall have become the owner thereof after the same has been so done and shall omit, neglect, or refuse to comply with the provisions of this ordinanee shall forfeit and pay for such offense the sum of seventy-five (75) dollars and the further sum of fifty (50) dollars for each period of one month for which the said violation shall continue, to be recovered as penalties of like amount are or hereafter shall be recoverable in the name and for the use of the City of Philadelphia, and when collected the same shall be paid into the Treasury thereof.

Approved the twenty-third day of July, A. D. 1924.

W. FREELAND KENDRICK
Mayor of Philadelphia

INTERPRETATION OF THE SPRINKLER ORDINANCE

Section 1. "Basements and sub-basements" shall be understood to be any story or stories whose height is more than fifty per cent. below the grade or pavement level. Buildings having a greater area than one thousand five hundred square feet in the first story, but in which the basement area is less than one thousand five hundred square feet, need not be sprinklered, provided the floor over the basement is of first-class fireproof construction and that means of entrance to the basement be from the exterior of the building only.

Section 2. "Automatic Sprinkler System." The Bureau will interpret this section to mean that the spacing of automatic sprinklers, the size of the water supply, the size of the distributing pipes, and the manner of erection, shall be in accordance with the standards of practice adopted by the National Fire Protection Association, at the time of installation.

Section 3. The Department will require that automatic dry pipe sprinkler systems are installed in basements and sub-basements where there is danger of the system freezing.

Section 4. "Approved devices" shall mean that all sprinklers, dry pipe valves, and other apparatus shall be of a type that is approved by the Chief of the Bureau of Building Inspection and the Chief of the Bureau of Fire, but all such approved devices shall bear the approval of the Underwriters' Laboratories of Chicago, Illinois.

Section 5. The "water supply" shall consist of a direct connection from the City water main and the arrangement of such connection shall comply

with the regulations of the Bureau of Water. There shall also be installed a steamer connection, City Fire Department standard, to be connected to the sprinkler equipment and to be clearly marked "Sprinkler Connection." If the City water is not available for the supply to the sprinkler system, the Chief of the Bureau of Building Inspection and the Chief of the Bureau of Fire shall decide what other supply will be acceptable.

Sections 6 and 7 are self-explanatory.

INTERPRETATION OF THE STANDPIPE ORDINANCE

Section 1. The "height" of a building shall mean the vertical distance of the highest point of the roof in the case of flat roofs; and for high-pitched roofs, the average of the height of the gable above the mean grade of the curbs of all the streets or the mean grade of the natural ground adjoining the building.

Section 2 is interpreted by this Department to mean standpipes serving only connections from the City Fire Department engines or high-pressure piping. They are to have no connection with any tank or the City water main direct. They are intended for the use of the Fire Department only.

Sections 3, 4 and 5 are self-explanatory.

AN ORDINANCE

To establish regulations for the location, size and use of buildings adjoining Cobbs Creek Park and Parkway, and Roosevelt Boulevard.

Section 1. The Council of the City of Philadelphia ordains, That no building, structure or fixture, any portion of which comes within two hundred feet from the boundary line of Cobbs Creek Park or Parkway and Roosevelt Boulevard, shall hereafter be erected, altered or used, except in conformity with the following regulations:

No such building hereafter erected on a lot abutting on Cobbs Creek Park or Parkway and Roosevelt Boulevard shall be used for a stable, for a public garage, for any manufacturing purpose, or for the display of a billboard or roof sign, and no such building, structure or fixture shall be erected or altered until the location and plans therefor have been approved by the Commissioners of Fairmount Park, and no sign, notice or advertisement of any kind visible from any point within the boundaries of Cobbs Creek Park or Parkway and Roosevelt Boulevard shall be displayed thereon, unless the design and location of said sign, notice or advertisement have been similarly approved. No permit for such erection or alteration shall be issued until the approval of the Commissioners has been obtained, and the erection or alteration shall conform to the design, location and plans approved.

Section 2. Any owner, tenant or occupant of a building, structure or fixture, responsible for its erection, alteration or use in violation of any of the foregoing regulations, shall be liable to a penalty of not less than five dollars nor more than twenty-five dollars, to be recovered for the use of the City before any magistrate, as debts of like amount are now recoverable, and, if the portion of such building, structure or fixture erected, altered or used or the sign, notice or advertisement displayed, in violation of any of said regulations, is not removed or the prohibited use is not discontinued within five days after the imposition of the penalty, the person offending shall be liable to a further penalty of twenty-five dollars a day, to be recovered as aforesaid, for every day after the expiration of the said period of five days, during which such violation continues.

Approved the thirtieth day of January, A. D. 1923.

J. HAMPTON MOORE
Mayor of Philadelphia

AN ORDINANCE

To prohibit the construction or erection of steps, cellar-doors, platforms, railings, fences, copings, terraces, enclosure walls beyond the confirmed street line on Broad Street, between Oregon Avenue and Cheltenham Avenue; providing a penalty for the construction or erection thereof, and providing a procedure for removal and for collecting the cost of said removal.

Section 1. The Council of the City of Philadelphia ordains, That from and after the approval of this ordinance it shall be unlawful to construct or erect any steps, cellar-doors, platforms, railings, fences, copings, terraces and enclosure walls, any portions of which extend beyond the confirmed street line, or enclose or occupy any portion of the space of the footway between the confirmed street line and the confirmed curb line on Broad Street, from Oregon Aveue to Cheltenham Avenue.

Section 2. Any person who shall construct or begin the construction or erection of any steps, cellar-doors, platforms, railings, fences, copings, terraces, enclosure walls, or other projections in violation of this ordinance shall forfeit and pay to the City of Philadelphia the sum of fifty (50) dollars for each offense, to be sued for and recovered in the manner as penalties for violation are by law sued for and recovered, and shall be required to remove said obstructions and replace the footway in its former condition.

Section 3. If the said person or persons shall neglect or refuse to remove such steps, cellar-doors, platforms, railings, fences, copings, terraces, enclosure walls, and replace the footway in its former condition within ten days from notice from the Department of Public Works, then and in that case said Department of Public Works is hereby authorized and directed to have the said work done and the bill for same presented for payment to the owner or owners in front of whose premises the said obstructions are constructed or erected, and in the event of said owner or owners refusing to pay said bill within ten days from the date thereof, the contractor who did the work shall be paid out of the item "For emergencies" in the annual appropriation to the Department of Public Works, Bureau of Highways, and the bill shall be transmitted to the City Solicitor to collect by lien from the owner or owners against whom the work has been charged.

All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the tenth day of March, A. D. 1921.

J. HAMPTON MOORE
Mayor of Philadelphia

AN ORDINANCE

To regulate the use of terra-cotta in detached buildings one story in height and in semi-detached and detached dwelling houses and garages three stories and less in height, curtain walls of fire-proof buildings, pent houses and bulkheads, and to regulate wooden shingle roofs on semi-detached and detached houses used for dwelling purposes in suburban districts, and providing a penalty for the violation or non-compliance with this ordinance.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That hollow tile may be used for the exterior walls of detached buildings one story in height, detached and semi-detached dwellings, stables and garages three stories or less in height, curtain walls of fire-proof buildings, pent houses and bulkheads.

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Crum Lynne, Delaware Co., Pa.

Section 2. All hollow tile shall be dense terra-cotta, free from checks and cracks, laid square and true and burned hard, so as to ring when struck, and not to absorb more than ten per cent. of its own weight in moisture. To have an ultimate crushing strength of not less than 3,000 pounds per square inch of available section of web area and shall not be loaded when in the wall to more than eighty pounds per square inch of effective bearing area.

Tiles shall have outer shell or wall not less than seven-eighths inches thick in its least dimensions. All interior webs shall be not less than three-fourths inches in thickness. Tiles shall be constructed with at least fifty per cent. solid material.

Non-bearing walls of hollow tile in curtain walls of buildings of the first class may have five-eighths of an inch thickness of outer shell and webs, provided the unsupported length of the shell and web is not over six inches and the block contains fifty per cent. solid material.

The Chief of the Bureau of Building Inspection may require a test to be made of such blocks before allowing same to be placed in the wall if in his judgment there be any doubt as to whether such blocks proposed to be used meet the requirements above specified.

Section 3. No foundation wall of any building or any party wall shall be constructed of hollow terra-cotta tile, and no hollow tile or terra-cotta wall or partition shall be supported in part or entirely by any wooden or other combustible beam, girder or post.

Section 4. Hollow tile exterior walls shall be the same thickness as now required for brick walls, and all such exterior wall shall be plastered on the outside three-fourths inches thick with Portland cement mortar.

Section 5. Hollow tile may be used for interior partitions in the above-mentioned buildings; however, such partitions shall be at least three inches thick if ten feet in height, four inches thick if ten feet to fifteen feet in height, and at least six inches thick when fifteen feet to twenty feet in height, and when the length of such partition exceeds fifty feet they shall be sufficiently strengthened by cross walls, partitions, piers or buttresses, subject to the approval of the Bureau of Building Inspection.

Section 6. All openings over three feet in width in hollow tile walls shall have lintels composed of steel, reinforced concrete, or reinforced tile of sufficient strength to carry the load imposed.

Section 7. When the floor or roof load is applied to said bearing or exterior walls in concentrations of two tons or more at one place, a solid pier of brick, reinforced concrete, or concrete filled tile shall be used under each concentration, each of said piers to be not less than twice the thickness of the wall of which it is a part, and no pier shall be loaded in excess of 80 pounds per square inch of its area.

Whenever the floor slab or joists rest on hollow terra-cotta wall composed of tile, with voids set vertically, or wherever a change in the thickness of the wall occurs, the course upon which the joists or slabs rest, or upon which the thinner wall rests, shall have the voids in the tiles or blocks in the course so bearing the load completely filled with Portland cement concrete, and so constructed that no joist, timber or other material whatsoever shall bear or transmit a load to the wall without having a bearing plate of iron, first quality hard brick, or terra-cotta or concrete block (filled or solid) under the same at the point where load is transmitted: And further provided, That in no case shall the area of the block to which the load is transmitted be less than double the area of the beam or other material transmitting the load.

Section 8. All walls hereinbefore referred to shall be constructed in the following manner: Blocks shall be set only in Portland cement mortar,

composed of not less than one part Portland cement and three parts clean, sharp sand. This mortar may be tempered with one part lime paste to eight parts of mortar. Hollow blocks shall be thoroughly bonded one to another, both vertically and longitudinally, and all joints filled with mortar, and when tiles are set in the wall the vertical web of one shall occur as nearly as practicable directly over the vertical web of the adjacent tile below. The blocks may be laid with voids horizontal, and with mortar joints between all blocks, or they may be laid with voids vertical, provided all horizontal bearings or joints are reinforced with metal fabric of from one-eighth to one-half inch mesh, capable of holding the mortar. This fabric shall be one-half inch less in width than the width of the wall of the course upon which it is applied, and shall be double lapped at all corners. Such web shall be spread on each horizontal course of the tile before the mortar is put on and shall be completely covered with and embedded in Portland cement mortar as the course of blocks upon it is being laid. No cutting of blocks will be allowed to admit pipes in bearing walls when pipes extend more than one-third of the story in height. The metal fabric hereinbefore specified may be omitted in non-bearing or curtain wall or where tile is laid in bearing walls with the voids horizontal.

"Section 9. Semi-detached and detached dwelling houses having sloping roofs of the gambrel or straight pitch types, erected in suburban districts, may have roofs covered with wooden shingles: Provided, No portion of such roofs, including cornice, shall come within eight feet of the party lines: And provided further, That this section shall not apply to mansard roofs."

Section 10. Any person or persons, firms or corporations, whether owner, builder, contractor, architect or workman, who shall violate any of the provisions of this ordinance, and who shall omit, neglect or refuse to comply with said ordinance within thirty (30) days after notice to that effect, shall forfeit and pay for each violation the sum of seventy-five (75) dollars, and the further sum of fifty (50) dollars for every period of one month for which the said person or persons shall omit, neglect or refuse to comply. All the aforesaid penalties to be recovered as penalties of equal amount are or shall be recoverable, in the name and for the use of the City, and, when collected, shall be paid into the Treasury thereof.

Section 11. All ordinances or parts of ordinances inconsistent herewith or supplied hereby be, and the same are hereby repealed.

Approved November 28, 1917.

AN ORDINANCE

To regulate the erection of porches and verandas in the City of Philadelphia, and providing a penalty for the violation thereof.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance all porches and verandas in the City of Philadelphia more than one story in height shall be constructed of incombustible material: Provided, however, That porches and verandas may be inclosed with glass.

Section 2. Any person, firm or corporation which shall violate any of the provisions of this ordinance by omitting, neglecting or refusing to comply with the terms hereof within thirty days after notice so to do from the Bureau of Building Inspection of the Department of Public Safety, City of Philadelphia, shall forfeit and pay for each offence the sum of seventy-five (75) dollars, and the further sum of fifty (50) dollars for each and every period of one month during which such person, firm or corporation

has omitted, neglected or refused to comply with the provisions of this ordinance. The said fines shall be levied and collected as like fines are now levied and collected by law.

Section 3. All ordinances or parts of ordinances inconsistent herewith or supplied hereby be, and the same are hereby repealed.

Approved June 28, 1917.

AN ORDINANCE

Amendatory to an ordinance to regulate the construction of frame buildings, fences and bay windows, approved March 28, 1894.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the first section of an ordinance entitled: "An ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894, be altered and amended by inserting after the words: "All of the twenty-third, twenty-fourth" the following: "Except that portion of the Twenty-fourth Ward described as follows: Beginning at the intersection of the center lines of Fortieth street and Lankenau avenue, southwardly along middle line of Lankenau avenue to land now or late of Francis Reilly; thence southwest partly by land now or late of Mark De Vine and partly by land of the Commissioners of Fairmount Park; thence southeast to middle of Fortieth street; thence northwestwardly along middle of Fortieth street to place of beginning, and the other two tracts described together as one tract, as follows: Beginning at a point in the middle of Fortieth street (80 feet wide) at a distance of four hundred and fifty-six (456) feet five and one-half (5½) inches southeastwardly from the point of intersection of the middle lines of Fortieth street and Lankenau avenue; thence southeastwardly along middle of Fortieth street to a point in the line of ground of the Commissioners of Fairmount Park; thence southeastwardly to a point, and still by land of the Commissioners of Fairmount Park, northeastwardly to northerly side of Ford road; thence still by land of the Commissioners of Fairmount Park northeastwardly to a point in the middle of Windemere avenue; thence northwestwardly along middle of said Windemere avenue to ground now or late of John McGill; thence southwestwardly along same on line at right angles to said Fortieth street to middle of Fortieth street, the place of beginning."

All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the tenth day of July, A. D. 1917.

THOMAS B. SMITH
Mayor of Philadelphia

AN ORDINANCE

Amendatory to an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay-windows," approved March 28, 1894.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the first section of an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay-windows," approved March 28, 1894, be altered and amended by inserting the following: "All that portion of the Forty-second Ward lying within the following boundaries: Beginning at Tacony creek and Wingohocking street; thence along Wingohocking street to Germantown avenue; thence along Germantown avenue to Stenton avenue; thence along Stenton avenue to

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Logan street; thence along Logan street to the P. & R. Railroad tracks; thence along the P. & R. Railroad tracks to Stenton avenue; thence along Stenton avenue to Cresheim avenue; thence along Cresheim avenue to Cheltenham avenue; thence along Cheltenham avenue to Fifth street; thence along Fifth street to Olney avenue; thence along Olney avenue to Front street; thence along Front street to Tabor road; thence along Tabor road to Tacony creek; thence along Tacony creek to the place of beginning."

Section 2. The prohibition against the erection of frame buildings shall apply to both sides of the streets named as boundaries.

Approved June 28, 1917.

AN ORDINANCE

Regulating the construction of frame buildings.

Whereas, By ordinance approved March 28, 1894, and by ordinance approved March 12, 1906, certain limits were established within which frame buildings were permitted to be erected until the first day of January, 1911, which time has since been extended to the first day of January, 1916; now, therefore,

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the time within which frame buildings may be erected as limited and defined in said ordinances be, and the same is hereby extended to the first day of January, 1921, when the lines defined in the first section of the ordinance approved March 28, 1894, shall be re-established: Provided, That nothing herein contained shall permit the erection of any frame building within five hundred feet of the Northeast Boulevard.

Approved April 19, 1916.

RESOLUTION

With regard to the interpretation of the fire escape law.

On December 1, 1913, the Bureau of Building Inspection adopted the following resolutions:

1. That fire escape ladders may run against the wall in place of being kept two feet away from the wall, provided that a hand-rail be provided on both sides of the stairway, with the inside hand-rail not less than six inches from the wall.

2. We approve of the type of escape covering one door on each floor with intermediate half paces, provided the wall of the building is sufficiently strong to support the load coming between the stories.

3. We approve of the placing of rear counter-balanced drop stairways in proximity to the wall of the building and leading down from the second floor platform, provided the construction of same is similar to that required in paragraph No. 1.

4. In all cases swinging ladders shall be kept clear of all obstructions.

RESOLUTION

On August 21, 1913, the Bureau of Building Inspection, in view of the difficulty in securing new metal door and window frames to fit old openings above and below fire escape platforms, resolved that:

If the present openings be covered with metal, the same will be accepted by the Bureau, provided that fire doors be provided for door openings, and metal window sash with wire glass, and with a fusible link, and chain for the lower sash, be provided.

FORMULA FOR CONSTRUCTION OF TOWER FIRE ESCAPE.

The said tower fire escape shall be divided from the building by, and completely inclosed with, brick walls or such other fireproof materials as shall be accepted by the Bureau of Building Inspection. The said walls to be built solidly from the foundation to and at least 36 inches above the roof.

The roof of said tower shall be built of hard, incombustible materials.

The stairs of said tower may be iron or wood; but in all cases there must be provided stone or iron thresholds; iron frames, or wood frames covered with metal; and iron doors, or wood doors covered with tin. The rise of said stairs shall not be more than eight (8) inches and the tread not less than nine (9) inches. The entrance to said tower shall be by means of an outside balcony or an incombustible vestibule, of which one side shall be entirely open and extend from the top of floor to under side of ceiling and the full width of the tower. The said open side to face a street or such open space as provides for exit of said tower.

There shall be a brick wall, or other wall of hard, incombustible material, separating the tower from the vestibule. The opening into tower from said vestibule to be not over seven (7) feet in height. The floor, ceiling and sides of said vestibule to be of hard, incombustible material.

The rails inclosing the side facing the open space or street to be not over four (4) feet high and not less than three (3) feet, may be open or inclosed.

The entrance to the tower from the building shall be through the vestibule.

Towers that have not the fire-proof vestibule shall have outside balconies; floors of balconies to be solid, and built of hard incombustible material and be of sufficient strength to carry the imposed weights.

The rails around said balconies shall be not over four (4) feet in height nor less than three (3) feet, and may be inclosed or open.

RESOLUTION

On March 23, 1914, the Bureau of Building Inspection resolved as follows:

That the Bureau permit the location of a fire tower at the rear end of a building fronting on one street only and having a bulk front in the first story, provided such fire tower has its exit into an alley of sufficient capacity, and provided that the exit door from tower open outwardly in such manner as to afford no obstruction to direct access to the nearest street.

AN ORDINANCE

Amendatory to an ordinance entitled: "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the first section of an Ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894, be altered and amended by striking out the words "And all of the thirty-sixth and thirty-seventh wards," and inserting in lieu thereof the following: "All of the thirty-sixth ward, except that portion bounded by Penrose avenue, Sheaff lane, Forty-second avenue south and the tracks of the Girard point branch of the Pennsylvania Railroad, and all of the thirty-seventh ward."

Approved May 9, 1912.

AN ORDINANCE

Approved October 19, 1911.

Amendatory to an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the first section of an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894, be altered and amended by striking out and changing the words "Port Royal avenue" wherever they appear in said section to the words "Parker avenue:" Provided, That not more than two frame dwellings, either singly or in pairs, shall be erected on a lot of the frontage of one hundred feet.

AN ORDINANCE

Extending the time to January 1, 1916, in which frame buildings may be erected as provided for in the ordinance approved the twelfth day of March, 1906, and amending such ordinance.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That so much of the ordinance approved the twelfth day of March, 1906, entitled "An Ordinance amendatory to an ordinance entitled 'An Ordinance to regulate the construction of frame buildings, fences and bay windows,' approved March 28, 1894," which provides as follows: "That on the first day of January, 1911, the lines defined in this amendment will cease and the lines defined in the first section of the ordinance to which this is an amendment shall be re-established," be, and the same is hereby amended to read as follows: "That on the first day of January, 1916, the lines defined in this amendment will cease and the lines defined in the first section of the ordinance to which this is an amendment shall be re-established."

Approved the twenty-first day of April, A. D. 1911.

JOHN E. REYBURN
Mayor of Philadelphia

AN ORDINANCE

Relating to the erecting and inspection of fire escapes and other appliances of like nature, providing for the issuing of certificates therefor; fixing the fees for such inspection and certificate; authorizing the appointment of inspectors under the Fire Marshal, and making an appropriation for the payment of their salaries and maintenance.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the Fire Marshal, under the direction of the Director of the Department of Public Safety, shall have the management, supervision and control of all matters pertaining to the enforcement of the regulations concerning fire escapes and other appliances of like nature, together with the inspection of the same; providing that nothing herein contained shall interfere with the duty of the Bureau of Building Inspection to make rules and regulations with respect to the erection and construction of fire escapes, to enforce compliance therewith, and to see that fire escapes are properly and safely erected in accordance with law and ordinance, and with the rules, regulations and requirements of said Bureau.

Section 2. It shall be the duty of the Fire Marshal or his inspectors to make at least quarterly inspection of all buildings having fire escapes or such other appliances erected thereon, as well as of all buildings required by law or ordinance to be provided and equipped therewith, and to ascertain whether the provisions of the Acts of Assembly and ordinances relative to the erection and maintenance of fire escapes and appliances are properly observed; to see that said fire escapes and appliances are properly maintained in such manner as to afford safe and convenient means of egress and escape; and to ascertain whether all passageways thereto, and the fire escapes themselves, are free from obstructions; and whether the fire escapes and appliances are kept in good condition and safe for use. And in cases where obstructions are found on such fire escapes, or in such passageways, or where the fire escapes or other appliances are not properly maintained, or are in need of painting, lubrication, repair, renewal or alteration, a written or printed notice shall be served upon the owner or occupant of the building upon which such fire escape or appliance is erected, directing him, her or them to forthwith make the necessary repairs, renewal or alteration, or to do the necessary work to such fire escape or appliance, or to cause the removal of such obstruction; and in cases where no fire escape or appliance is provided, when required by law or ordinance, a written or printed notice shall be served upon the owner or occupant of the building upon which such fire escape or appliance should be erected, directing him, her or them to erect and supply the same within thirty (30) days of the giving of such notice. The Fire Marshal shall issue a certificate to the owner or occupant of every building inspected as aforesaid, and found to be in compliance with the laws and ordinances, or, if such notice shall have been observed and obeyed, certifying to the condition of said fire escape and other appliances, which certificate shall be good and available for one year from the date of its issue: Provided, however, That such certificate shall not exempt the owner or occupant of such premises from compliance with any further notice, order or direction with respect to such fire escapes or appliances which may be given him during said period of one year.

Section 3. When any person or persons shall be about to erect any exterior stairway, to be used as a fire escape for any building or buildings in the City of Philadelphia, he, she or they shall make application to the Bureau of Building Inspection for a permit to do the same; the said application must be accompanied by such plans and specifications as shall be required by the Bureau of Building Inspection, and shall set forth the location of the proposed fire escape. The Chief of the Bureau of Building Inspection shall refer the said application to the inspector of the district in which the proposed fire escape is to be erected, and the said inspector shall report upon the adaptability of the proposed location; also, whether the walls are sufficiently strong to carry the proposed fire escape. Upon receipt of a favorable report from the inspector, the Bureau shall issue a permit for the erection of the fire escape, the fee for which shall be one (1) dollar.

Section 4. No permit shall be granted for the erection of any fire escape which is not in accordance with law and with the formula of construction adopted by the Bureau of Building Inspection.

Section 5. Any person or persons who shall construct any fire escape without first securing a permit, or who shall erect a fire escape not in accordance with the plans approved by the Bureau of Building Inspection, or shall change the location of the said fire escape, or who shall violate any of the provisions of any section of this ordinance, or shall fail to comply with any notice herein provided for shall be subject to a penalty of fifty (50) dollars, and if such violation shall continue for ten (10) days after the expiration of any such notice, an additional penalty of twenty-five (25) dollars shall be added for every month or fraction thereof during which the said violation shall continue. All of the aforesaid fees and

penalties shall be recovered as like fees and penalties of equal amounts are now recoverable by law.

Section 6. The Director of the Department of Public Safety is hereby authorized to appoint ten inspectors under the Fire Marshal, at an annual salary of one thousand two hundred (1,200) dollars each, and there is hereby appropriated to Item 1 in the appropriation to the Department of Public Safety, Bureau of Police, for the year 1911, the sum of twelve thousand (12,000) dollars for the payment of said salaries for the year 1911, and to Item 21, of the said appropriation, for keep of horses, transportation, etc., the sum of four thousand (4,000) dollars; and for postage, printing, stationery, etc., one thousand (1,000) dollars; total, five thousand (5,000) dollars.

Section 7. This ordinance to be in full force and effect on and after January 1, 1911.

Section 8. So much of the ordinance approved January 7, 1882, entitled "An Ordinance to establish a system for the erection, registration and inspection of fire escapes in the City of Philadelphia," of Sections 5 and 28 of the Ordinance approved December 30, 1886, entitled "An Ordinance to carry into effect the Act of Assembly entitled 'An Act for the better government of cities of the first class in this Commonwealth,' approved June 1, 1885," of the Ordinance approved December 10, 1896, entitled "An Ordinance regulating the inspection and location of fire escapes," and of all other ordinances or parts of ordinances as may be inconsistent herewith or supplied hereby, be and the same is hereby repealed.

Approved the twenty-fourth day of February, A. D. 1911.

JOHN E. REYBURN
Mayor of Philadelphia

AN ORDINANCE

Amending ordinance approved March 28, 1894, by changing the territory in the Fortieth Ward in which frame buildings may be erected.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the ordinance approved March 28, 1894, be, and the same is hereby amended so as to prohibit the erection of frame buildings in all portions of the Fortieth Ward, excepting in the territory bounded by and described as follows: Beginning at the Schuylkill river and the Baltimore and Ohio Railroad; thence along the said railroad to Botanic avenue; thence along Botanic avenue to Powers' lane; thence southeast along Powers' lane to Landis creek; thence along Landis creek to Island road; thence east along Island road to Church creek; thence south to Bow creek or County line; thence along Bow creek or County line to the Schuylkill river; thence along the Schuylkill river to the Baltimore and Ohio Railroad and place of beginning.

All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the ninth day of November, A. D. 1908.

JOHN E. REYBURN
Mayor of Philadelphia

AN ORDINANCE

To amend an ordinance, entitled "An Ordinance regulating the placing of streets upon the city plan and the issuing of building and other permits by the Departments and Bureaus of the City," approved the eighth day of April, 1890.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the Ordinance of Councils, approved the eighth day of April, 1890, entitled "An Ordinance regulating the placing of streets upon the city plan and the issuing of building and other permits by the Departments and Bureaus of the City," be and the same is hereby amended by striking out the words and figures "thirty (30) feet" wherever they appear and inserting in lieu thereof the words and figures "forty (40) feet:" Provided, That this ordinance shall not apply to any street now on the city plan or that is actually or legally opened or built upon.

Approved the second day of April, A. D. 1906.

JOHN WEAVER
Mayor of Philadelphia

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AN ORDINANCE

Amendatory to an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the first section of an ordinance entitled "An Ordinance to regulate the construction of frame buildings, fences and bay windows," approved March 28, 1894, be altered and amended by striking out the words "all of the Twenty-third Ward," and inserting the following: "All that part of the Twenty-third Ward commencing at Frankford creek and Wingohocking street; thence along Wingohocking street to Oakland street; thence along Oakland street to Lindley street; thence along Lindley street to Leiper street; thence along Leiper street to Wakeling street; thence along Wakeling street to Tackawanna street; thence along Tackawanna street to Margaretta street; thence along Margaretta street to Pennsylvania Railroad; thence along Pennsylvania Railroad to the Frankford creek; thence along the Frankford creek to the place of beginning; also both sides of Frankford avenue, between Wakeling street and Dark Run lane." Also strike out the words, "Twenty-fifth Ward," and insert the following: "All that portion of the Twenty-fifth Ward bounded on the east by the Delaware river, on the west by Kensington avenue, on the north by Frankford creek and Luzerne street, and on the south by Lehigh avenue;" also strike out all that portion relating to the Thirty-fifth Ward after the words, "boundaries or lines between," and insert the following: "Magee street and Bleigh street and Frankford avenue and Delaware river, and along the line of Frankford avenue, from Dark Run lane to Pennypack creek: Provided, however, That on the first day of January, 1911, the lines defined in this amendment will cease, and the lines defined in the first section of the ordinance to which this is an amendment shall be re-established.

Approved the twelfth day of March, A. D. 1906.

JOHN WEAVER
Mayor of Philadelphia

REGULATIONS

Of the Bureau of Building Inspection of the City of Philadelphia for the Testing of New Materials Used in Building Construction.

1. These regulations are to apply to all such new materials as are used in building construction, in the same manner and for the same purposes, as natural stones, brick and concrete are now authorized by the Building Law, Rules and Regulations, of the Bureau of Building Inspection.

2. Before any such material is used in buildings, an application for its use and for a test of the same must be filed with the Bureau of Building Inspection. A description of the material and a brief outline of its manufacture must be embodied in the application.

3. The material must be subjected to the following tests: Transverse, Compression, Absorption and Freezing. Additional tests, including Fire test, may be called for when, in the judgment of the Chief of the Bureau of Building Inspection, the same may be desired or considered necessary. All such tests shall be made under the supervision of the Bureau, in the Philadelphia Testing Laboratory attached to the Bureau of Surveys.

4. The results of the tests, whether satisfactory or not, must be placed on file in the Bureau of Building Inspection. They shall be open to public inspection, but need not necessarily be published.

5. For the purposes of the tests, at least 10 samples or test pieces must be provided. Such samples must represent the ordinary commercial product. They may be selected from stock by the Chief of the Bureau of Building Inspection, or his representative, or may be made in his presence, at his discretion. The samples must be approximately eight inches long, four inches wide and two inches thick. In cases where the material is made and used in special shapes or forms full size samples may also be called for and tested in such manner as may be directed by the Chief of the Bureau of Building Inspection, to determine the physical characteristic specified in Regulation 3.

6. The samples may be tested as soon as desired by the applicant but in no case later than sixty days after manufacture.

7. The weight per cubic foot and specific gravity of the material must be determined.

8. These tests shall be made in series of at least five, except that in the fire tests a series of two (four samples) is sufficient. The transverse tests shall be made first on full-size samples (8 x 4 x 2). The resulting half samples are then used for the compression and absorption tests, but in no case must both halves of the same piece be used in either series. Half samples may also be used for the freezing and fire tests under the same restrictions. The remaining samples are kept in reserve, in case unusual flaws or exceptional or abnormal conditions make it necessary to discard

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certain of the tests. All the samples must be marked for identification and comparison.

9. The Transverse test shall be made as follows: The sample shall be placed flat-wise on two rounded knife-edge bearings set parallel, seven inches apart. A load is then applied on top, midway between the supports, and transmitted through a similar rounded edge, until the sample is ruptured. The modulus of rupture shall then be determined.

10. The Compression test shall be made as follows: The sample must first be thoroughly dried to a constant weight. It must be carefully measured, then bedded flat-wise on blotting paper, to secure a uniform bearing in the testing machine, and crushed.

11. The Absorption test must be made as follows: The sample is first thoroughly dried to a constant weight. The weight must be carefully recorded. It is then placed in a pan or tray of water, immersing it completely. It is again carefully weighed at the expiration of forty-eight hours from the time of immersion. Its compressive strength, while still wet, is then determined in the manner specified in Regulation 10.

12. The Freezing test is made as follows: The sample is immersed, as described in Regulation 11, for at least four hours, and then weighed. It is then placed in a freezing mixture or a refrigerator, or otherwise subjected to a temperature of less than fifteen degrees Fahrenheit, for at least six hours. It is then removed and placed in water where it must remain for at least one hour, the temperature of which is at least one hundred and fifty degrees Fahrenheit. This operation is repeated ten times, after which the sample is again weighed while still wet from last thawing. Its crushing strength should then be determined, as called for in Regulation 10.

13. The Fire test must be made as follows: Two samples are placed in a cold gas furnace, in which the temperature is gradually raised to seventeen hundred degrees Fahrenheit in one hour. One of the samples is then plunged in cold water (about fifty to sixty degrees Fahrenheit), and results noted. The second sample is permitted to cool gradually in air, and the results noted.

14. The following requirements must be met to secure an acceptance of the materials. The modulus of rupture must average four hundred and fifty and must not fall below three hundred and fifty in any case. The ultimate compressive strength must average three thousand pounds per square inch and must not fall below twenty-five hundred in any case. The percentage of absorption (being the weight of water absorbed divided by the weight of the dry sample) must not average higher than fifteen per cent. and must not exceed twenty per cent. in any case. The reduction of compressive strength must not be more than thirty-three and one-third per cent. except that when the lower figure is still above three thousand pounds per square inch, the loss in strength may be neglected. The freezing and thawing process must not cause a loss in weight greater than ten per cent., nor loss in strength of more than thirty-three and one-third per cent., except that when the lower figure is still above three thousand pounds per square inch, the loss in strength may be neglected. The fire test must not cause the material to disintegrate.

15. The approval of any material is given only under the following conditions:

(a) A brand mark for identification must be impressed on, or otherwise attached to the material.

(b) A plant for the production of the material must be in full operation when the official tests are made.

(c) The name of the firm or corporation and the responsible officers must be placed on file with the Chief of the Bureau of Building Inspection, and changes in same promptly reported.

(d) The tests must be repeated at any time when called for, on samples selected from the open market, when there is any doubt whether the product is up to the standard of these regulations.

(e) In case the results of tests made under this condition (d) should show that the standard of these regulations is not maintained, the approval of this Bureau will be at once suspended or revoked.

EDWIN CLARK
Chief of the Bureau of Building Inspection

Approved,
Sept. 28, 1906.
R. J. MCKENTY,
Director.

AN ORDINANCE

To prohibit the erection of porches beyond the building line of the streets or highways of the City, declaring such porches to be a nuisance, providing a penalty for the erection thereof, and providing for the collection of the cost of removal.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance, it shall be unlawful to erect any porch projecting beyond the building line upon any of the public streets or highways of the City, and any porch so erected after this date is hereby declared a nuisance.

Section 2. Any person who shall construct, or begin the construction of any porch, in violation of this ordinance, shall forfeit and pay to the City of Philadelphia the sum of fifty (50) dollars for each offence, and shall be required to remove said porch and replace the street in its proper condition.

Section 3. If the said person or persons shall neglect or refuse to remove such porch and replace the street in proper condition, as set forth, within ten days from the date of notice from the Department of Public Works, then and in that case the said Department is hereby authorized and directed to have the said work done and the bill for same presented for payment to the owner or owners in front of whose properties said porch is constructed or attempted to be constructed, and in the event of said owner or owners refusing to pay said bill within ten days from the date thereof, the contractor who did the work shall be paid out of the item for emergencies in the annual appropriation to the Bureau of Highways, and the bill shall be transmitted to the City Solicitor to collect by lien from the owner or owners against whom the work has been charged. The penalty herein mentioned shall be sued for and recovered in the manner as penalties for violation are by law sued for and recovered.

Section 4. So much of Section 11 of ordinance of September 23, 1864, as permits the erection of porches, and all ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the twenty-third day of February, A. D. 1906.

JOHN WEAVER
Mayor of Philadelphia

AN ORDINANCE

To regulate and determine the license fees for permits in the Bureau of Building Inspection (Department of Public Safety) as required by Section 50 of the Act of Assembly approved May 5, 1899.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That where any person or persons shall be desirous of erecting, constructing or altering any house or building, or making any other building improvement for which the Acts of Assembly and ordinances of the City of Philadelphia require the issuing of a permit from the Bureau of Building Inspection, such person or persons shall make application at the office of the Bureau of Building Inspection (Department of Public Safety) for a permit for the purpose, and shall pay for such permit the various sums as follows:

Section 2. For the inspection of each and every building the fee shall be eight (8) dollars for the first five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, with the further sum of two (2) dollars for each additional five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, if the building be one of the first class; six (6) dollars for the first five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, and the further sum of one (1) dollar and fifty (50) cents for each additional five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, if the building be of the second class; five (5) dollars for the first five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, and the further sum of one (1) dollar for each additional five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, if the building be of the third class; four (4) dollars for the first five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, and the further sum of one (1) dollar for each additional five hundred (500) square feet of floor area, or fractional part thereof, contained in the building, if the building be of the fourth class.

Section 3. For the inspection of sheds and reviewing stands the fee shall be two (2) dollars for the first five hundred (500) square feet of floor area, or fractional part thereof, contained in the structure, and the further sum of one (1) dollar for each additional five hundred (500) square feet, or fractional part thereof.

Section 4. In determining the floor areas in buildings, as referred to anywhere in this ordinance, the outside measurements of the building shall be taken.

Section 5. For the inspection of additions to existing buildings the fee shall be the same as that provided above for the various classes of buildings.

Section 6. For the inspection of buildings for which application is made for repairs or alterations, or for improvements such as bulk windows, bay windows, oriel windows, overhanging baths, fireplaces, or for the installation or renewal of or repairs to hot-air heaters or flues, hot-water or steamheating plants, furnaces, ranges, foundations for engines and power boilers, for the installation of motors, for the erection or renewal of or repairs to roof tanks and supports, fire escapes, signs on roofs, spires for marquise and projecting sign anchorage and other improvements not elsewhere specifically indicated, the fee shall be two (2) dollars for each one thousand (1,000) dollars, or fractional part thereof, of the estimated cost of such improvement: Provided, That no such permit shall be issued for less than three (3) dollars.

Section 7. For the inspection of miscellaneous construction work, such as retaining walls, tank towers, wireless towers, coal pockets and similar

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structures, trestles, and other miscellaneous work not elsewhere specifically referred to, the fee shall be two (2) dollars for each one thousand (1,000) dollars, or fractional part thereof, of the estimated cost of such improvement: Provided, That no such permit shall be issued for less than three (3) dollars.

Section 8. For the inspection of buildings where application is made to tear down, and no application is made for a permit to erect a new building upon the same ground, the fee shall be three (3) dollars.

Section 9. For the checking of computations to determine the safe carrying capacity of floors, as submitted to the Bureau of Building Inspection, the fee shall be three (3) dollars for each building.

Section 10. For fence views, the fee shall be three (3) dollars each, as fixed by Act of Assembly approved May 6, 1870.

Section 11. This ordinance shall be in full force and effect on and after January 1, 1917.

Section 12. All ordinances or parts of ordinances inconsistent herewith or supplied hereby be, and the same are hereby repealed.

Approved December 28, 1916.

AN ORDINANCE

Regulating the construction of reviewing stands.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That hereafter any person or persons, firms or corporations, who desire to erect any stand for the purpose of reviewing any parade, procession, or festivity of any kind whatsoever, shall first obtain permission so to do from the Director of the Department of Public Safety. Upon said permission being granted to the said person or persons, firms or corporations, they shall make application to the Bureau of Building Inspection of the Department of Public Safety for permit to erect the said stand, the fee for the inspection of which shall be two (2) dollars for a stand of a superficial area of five hundred (500) feet or less, and the further sum of one (1) dollar for each additional five hundred (500) feet or fraction thereof, superficial area. All such stands must be erected in conformity with the conditions and regulations established by the said Bureau of Building Inspection. The Director of the Department of Public Safety shall have the right to prohibit the use of and revoke the permit for the erection of any stand upon report from the Chief of the Bureau of Building Inspection that any of the conditions or regulations of the said Bureau of Building Inspection have been violated.

Section 2. Any person or persons, firms or corporations, whether owner, builder or contractor, who shall erect any stand for reviewing purposes without permit therefor first issued or in violation of any of the provisions of this ordinance, or who shall become the owner thereof after the same has been so done, and who shall omit, neglect, or refuse to remove or make the said stand conform in all respects to the requirements of this ordinance immediately upon notice to that effect from the Bureau of Building Inspection shall forfeit and pay for such offence the sum of seventy-five (75) dollars, the said penalty to be recovered as penalties of equal amount are or shall be recoverable in the name of and for the use of the City, and when collected shall be paid into the Treasury thereof.

Section 3. All ordinances or parts of ordinances inconsistent herewith be and the same are hereby repealed.

Approved the seventeenth day of October, A. D. 1898.

CHAS. S. WARWICK
Mayor of Philadelphia

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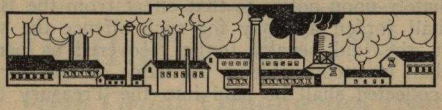

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AN ORDINANCE

To provide for the inclosing of vacant lots and lots upon which building operations are in progress or upon which excavations have been made.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That, from and after the passage of this ordinance it shall be the duty of the owner or owners of unimproved real estate within the City of Philadelphia to inclose the same with a suitable fence upon that part facing on a public highway where the same is dangerous.

Section 2. It shall be the duty of the owner or owners of any lot upon which a building is being erected or upon which an excavation for any purpose shall have been made, where the said lot borders on a public highway, to inclose the same with a suitable fence.

Section 3. Fences erected under the provisions of Sections 1 and 2 of this ordinance shall be erected under the supervision of the Bureau of Building Inspection, and subject to such regulations as to material and dimensions as shall be prescribed by that Bureau.

Section 4. Any person violating any of the provisions of this ordinance shall be subject to a penalty of fifty (50) dollars for each week during which such violation continues, to be recovered as debts of like amount are now by law recoverable: Provided, That such penalty shall not be imposed upon any person until he shall have failed to comply with the provisions of this ordinance after ten days' notice so to do from the Department of Public Safety.

Approved November 9, 1897.

AN ORDINANCE

Regulating the inspection and location of fire escape.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That when any person or persons shall be about to erect any external stairway, to be used as a fire escape, from any building or buildings, within the City of Philadelphia, he or they shall make application to the Bureau of Building Inspection for a permit to do the same, the said application must be accompanied by such plans and specifications as shall be required by the Bureau of Building Inspection, and shall also set forth the location of the proposed fire escape. The Chief of the Bureau shall refer the said application to the inspector of the said district in which the proposed fire escape is to be erected, and the said inspector shall report upon the adaptability of the proposed location, also whether the walls are sufficiently strong to carry the proposed escape. Upon receipt of a favorable report from the inspector the Bureau shall issue a permit for the erection of the fire escape, the fee for which shall be one (1) dollar.

Section 2. No permit shall be granted for the erection of any fire escape which is not in accordance with the formula of construction adopted by the Bureau of Fire Escapes.

Section 3. Any person or persons who shall construct any fire escape without permit first secured, or who shall erect a fire escape not in accordance with the plans approved by the Bureau of Building Inspection, or shall change the location of said fire escape, or who shall violate any of the provisions of any section of this ordinance shall be subject to a penalty of fifty (50) dollars, and if such violation shall continue after notice given by the Bureau of Building Inspection, to have the same removed, an additional penalty of twenty-five (25) dollars shall be added for every month or fraction thereof the said violation is permitted to exist; all of the aforesaid penalties to be recovered as penalties of equal amount are or shall be recoverable for the use of the city.

Approved December 10, 1896.

AN ORDINANCE

To regulate the construction of frame buildings, fences and bay windows, approved March 28, 1894.

Section 1. The limits within which all buildings hereafter erected or altered shall be required to conform to the Act of Assembly of May 7, 1855, and of the Acts in amendment thereof and in addition thereto, and of the Act of June 8, 1903, are hereby established and defined as follows: All that portion of the city which is included on or within that portion of the First Ward, bounded on the south by Oregon avenue from the Delaware river to Seventh street; thence along Seventh street to the Back Channel, League Island; all that portion of the city which is included within the Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, Nineteenth and Twentieth Wards; and all that portion of the Twenty-first Ward on or within the following boundary lines, viz.: Beginning at Port Royal avenue and Schuylkill river; thence along Port Royal avenue to Ridge avenue; thence along Ridge avenue to Roxborough avenue; thence along Roxborough avenue to Houghton street; thence along Houghton street to Hermit street; thence along Hermit street to Wissahickon creek; thence along Wissahickon creek to Schuylkill river; thence along Schuylkill river to place of beginning; all that portion of the Twenty-second Ward on and west of Broad street; all of the Twenty-third, Twenty-fourth, Twenty-fifth, Twenty-sixth Wards; all that portion of the Twenty-seventh Ward on or within the following lines: Beginning at Schuylkill river and Market street; thence along Market street to Cobb's creek; thence along Cobb's creek to Woodland avenue; thence along Woodland avenue to Tinicum Island road; thence along Tinicum Island road to Powers' lane; thence along Powers' lane to Eastwick street to the Baltimore and Ohio Railroad; thence along the Baltimore and Ohio Railroad to Schuylkill river; thence along the Schuylkill river to the place of beginning; all of the Twenty-eighth, Twenty-ninth, Thirtieth, Thirty-first, Thirty-second, Thirty-third, Thirty-fourth, and that portion of the Thirty-fifth Ward on or within the boundaries or lines between Dark Run lane and Bleigh street and between Frankford avenue and the Delaware river, and on the said line of Frankford avenue to Pennypack creek, and within that portion bounded by the Pennypack creek, the New York Division of the Pennsylvania Railroad, Decatur street and Frankford avenue, and all of the Thirty-sixth and Thirty-seventh Wards.

Provided, That, on land assessed at farm rates, and used for farm purposes, frame buildings for farm purposes only shall be erected.

Provided, That the prohibition against the erection of frame buildings shall apply to both sides of the streets named as boundaries.

Provided, however, That in the First, Twenty-first, Twenty-second, Twenty-third, Twenty-fifth, Twenty-sixth, Twenty-seventh, Twenty-eighth, Thirty-third, Thirty-fourth, Thirty-fifth, and Thirty-sixth Wards temporary frame buildings for church worship may be erected, subject to the following conditions:

First—No such frame buildings shall be more than one story high, if built in any portion of the aforesaid wards within the limits defined in Section 1.

Second—No permit shall be granted for such buildings unless the applicant shall have the consent in writing of at least two-thirds of the adjoining or abutting property owners, and the owners of properties on the opposite side of the street to the lot desired to be built on shall, to the width of the said lot, be deemed adjoining owners.

Third—No permit shall be granted for any such building until the party desiring the permit shall file with the City Solicitor a bond in the sum of $500 conditioned that the said building shall be used only for purposes of church worship, and that it will be removed when it ceases to be used for church worship, or whenever Councils shall amend this ordinance so as to prohibit frame church buildings in the territory within which the building is situate, or on the passage of a resolution by Councils requiring its removal.

Section 2. Within the limits defined in Section 1, it shall not be lawful to enlarge a frame building, or to remove any such building, except on the same lot or an adjoining lot belonging to the same owner. It shall not be lawful to repair, reconstruct or remove any frame building which has been injured more than fifty (50) per cent. of its original value by wear and tear or by the effects of the elements, or by fire; said value to be determined by the Bureau of Building Inspection.

Section 3. Within the limits defined in Section 1, it shall be lawful to erect on wharves frame sheds not exceeding twenty-seven (27) feet in height, and elevators for the storage of grain, or sheds of wood for the storage of coal or lumber, but all the external parts of such sheds and elevators (except sheds for the storage of lumber) shall be covered with slate, tile, metal or incombustible material, and their mode of construction and location shall be subject to the approval of the Bureau of Building Inspection.

Section 4. Within the limits defined in Section 1, it shall not be lawful to erect or construct upon the first story of any building any bay, oriel, store or bulk window, projecting beyond the street line.

Section 5. Bay and oriel windows may hereafter be constructed upon buildings where projecting over the street line, as follows: The walls of all such bay or oriel windows, if made of combustible material, shall be covered with metal or other incombustible materials. The limitation of the dimensions and positions of such bay or oriel windows shall be as follows:

First—No such bay or oriel window shall be at a less distance than ten (10) feet from the sidewalk.

Second—No such bay or oriel window shall project more than three (3) feet over the street line of any building.

Third—No such bay or oriel window shall have a greater frontage than fifteen (15) feet.

Fourth—There shall not be more than one bay or oriel window for any twenty-five (25) feet of frontage, and no two bay or oriel windows upon the same story shall be built nearer to each other than five (5) feet.

Fifth—It shall not be lawful to erect any bay or oriel window except within lines drawn from the intersection of the party lines and the street line at an angle of twenty (20) degrees with the latter.

Nothing herein contained shall, however, limit the size of bay or oriel windows which are built in such manner as not to project over the street line of the buildings of which they form a part, but the size, number, construction and structural parts of such bay or oriel windows shall be subject to the approval of the Bureau of Building Inspection: Provided, however, That no bay or oriel window shall project more than four (4) feet from the wall line of the house of which it is a part.

Section 6. It shall not be lawful to build any fence of wood dividing or inclosing any property of a greater height than ten (10) feet from the ground, nor any fence beyond the building line. Provided, however, That railings may be constructed around excavated areas now existing. This section shall not prohibit the erection of a temporary fence during building operations, but no such fence shall be erected more than five (5) feet from the building line.

Section 7. Outside the limits defined in Section 1 wooden buildings may be erected, subject to the following restrictions and regulations: A wooden building to be used as a dwelling house shall not exceed a height of forty-five (45) feet, and external walls of said building shall not be placed at a less distance than eighteen (18) inches from the party line of the lot upon which the building is to be erected, unless a brick external wall is substituted for the wooden wall, and of a thickness described by the Act of Assembly approved June 8, 1893, regulating the thickness of brick external walls.

Where a wooden building is already erected for dwelling purposes upon an adjoining lot, there shall be between the walls of the building erected and the one to be erected—if of wood—a clear, open space of three (3) feet between the said buildings.

In the erection of wooden buildings in blocks of two or more houses, to be occupied for dwelling purposes, the said buildings shall have intercepting brick walls not less than nine (9) inches thick, said walls to be carried up and topped out ten (10) inches above the roof and covered with metallic covering.

Wooden buildings to be used for other purposes than that of a dwelling house shall not exceed fifty (50) feet in height above the grade of the street or place upon which the said building is to be erected, and shall not be placed at a less distance than ten (10) feet from any wooden building which is twenty-five (25) feet or more in height, or at a less distance than four (4) feet from any other wooden building which is less than twenty-five (25) feet in height.

Section 8. All wooden buildings shall be built upon secure foundations of stone or brick, carried up to the surface of the ground. The foundations, if of brick, shall not be less than thirteen (13) inches thick, and if of stone shall not be less than sixteen (16) inches thick. All foundations shall be laid upon solid ground, or upon piling, or other solid substructure. In the construction of workshops or other buildings of a like character, or for temporary purposes, built upon soft or marshy land, the inspector may, in his discretion, permit the sills to be placed upon mudsills or blocking, or upon piles cut to the height of grade.

All wooden buildings shall be constructed to carry such safe weights per superficial foot for the several purposes for which they are constructed as is defined in Section Twenty-six (26) of the Act of Assembly, approved June 8, 1893.

Section 9. In all wooden buildings hereafter erected or altered, the framing around flues, and the construction of chimneys, flues, hearths, trimmer arches, open fireplaces, and hot-air flues and heating apparatus, steam boilers and ranges, shall be in accordance with the Act of Assembly approved June 8, 1893.

Section 10. Open shelter sheds of wood may be erected under permit, but no such shed shall be enclosed with combustible materials on any of its four sides. The location and construction of said sheds shall be subject to the inspection and approval of the Bureau of Building Inspection.

Section 11. All constructions, extensions, or repairs, under the provisions of the said Act of Assembly, approved June 8, 1893, or under the provisions of this ordinance, shall be done only after permit is granted by the Bureau of Building Inspection and in conformity with the permit; and any person or persons building, altering, or repairing without such permit first secured, or otherwise than in conformity with the said permit, or the said Act, or this ordinance shall be subject to the several penalties imposed by the said Act for violations of its provisions.

Section 12. All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

THE ORDINANCE

Of June 12, 1894, provides:

Section 1. That Section 1 of an ordinance entitled "An Ordinance to regulate the construction of frame buildings, etc.," approved March 28, 1894, be, and the same is hereby amended by inserting after the word "beginning" in the twenty-third line the words "and all that portion of the Twenty-first Ward lying between the Wissahickon creek, Wissahickon avenue and School lane," so that the same will read, "Thence along Schuylkill river to place of beginning, and all that portion of the Twenty-first Ward lying between the Wissahickon creek, Wissahickon avenue and School lane."

Also amend Section 2 by adding the following words at the end of the section; and in addition thereto: "Any person or persons who shall make any alteration, construction or removal without permit therefor first issued, or in violation of any of the provisions of this ordinance, or who shall have become the owner thereof after the same has been done, and who shall omit, neglect or refuse to remove the same within thirty (30) days after notice to that effect, shall forfeit and pay for each offence the sum of seventy-five (75) dollars, and a further sum of twenty-five (25) dollars for every period of one month for which the said person or persons shall omit, neglect or refuse to remove the same after the expiration of the notice aforesaid, and any person or persons who shall contract for the erection or construction of any building or other thing in violation of any of the provisions of this ordinance shall be subject to a penalty of twenty-five (25) dollars. All of the aforesaid penalties to be recovered as penalties of equal amount are or shall be recoverable for the use of the city."

AN ORDINANCE

Of June 30, 1892

To provide for the widening of Walnut street from Fifth to Twenty-second.

Provides that the Bureau of Surveys be authorized to revise the city plan, so as to make the width of Walnut street, from Fifth street to Twenty-second street, such as shall conform with the buildings thereon erected, as the same may be practicable; such width to be uniform in each block. After the confirmation and establishment of said lines it shall not be lawful for any owner or builder to erect any new building, or to rebuild or alter the front or add to the height of any building now erected, without making it recede so as to conform to the line established.

Amended by Ordinance of December 30, 1892, by striking out the word "Fifth" and inserting the word "Sixth."

AN ORDINANCE

To regulate the placing of streets upon the city plan and the issuing of building and other permits by the Departments and Bureaus of the city.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance no street hereafter to be opened shall be accepted or placed upon the plans of the city that is of a less width than thirty (30) feet, and in no case shall a street be so placed unless it shall run from one public street to another, and in a straight line: Provided, That this ordinance shall not be construed to repeal the existing ordinance fixing the widths of streets in the Twenty-second Ward at not less than forty (40) feet.

Section 2. It shall be unlawful for the Board of Building Inspectors, Department of Public Works, or any Bureau under it or any official of the city, either to issue, cause or allow to be issued, any permit or permits for the erection of any building or buildings or for the introduction of gas, water, sewer or drains, or to make surveys or give lines, or in any manner to countenance, authorize or permit the erection of any building or buildings fronting on any street unless said street shall be of not less than thirty (30) feet in width as provided in Section 1 of this ordinance or on the city plan, and all of said streets shall be continuous and run in a straight line from one public street to another.

Approved this eighth day of April, A. D. 1890.

Amended by Ordinance of June 9, 1890, providing that the placing of streets upon the city plan and the issuing of permits shall not apply to any street that was on the city plan or was actually or legally opened at the time said ordinance was passed. Further amended by Ordinance of July 2, 1890, so that the requirements of streets running in a straight line shall not apply to or be operative within the bounds of the Twenty-first and Twenty-second Wards.

AN ORDINANCE

Amending an ordinance entitled "An Ordinance relative to the widening of Arch street," approved the twelfth day of February, 1886.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the ordinance entitled "An Ordinance relative to the widening of Arch street," approved the 12th day of February, 1886, be altered and amended by adding the words: "And provided further, That nothing herein contained shall be held or construed to prevent any owner of property now existing on Arch street, from taking out the brick work of front wall between the two windows on first floor, carrying the weight on an iron beam and putting in a bulk window, the said bulk window not to project beyond the building line," so that the same shall, as amended, read: "That the Department of Surveys be, and is hereby directed to widen Arch street, on the north and south lines thereof, from Eighth street to the river Schuylkill, on the city plan, so that hereafter the width of Arch street shall be seventy-two (72) feet from the building line to building line, or thirty-six (36) feet from the now established centre line of said Arch street: Provided, That this ordinance shall not extend to any buildings now erected on said Arch street, and shall extend to all buildings that may hereafter be erected or altered fronting on said street, and that the Department of Surveys shall prepare a plan of said street showing all buildings that will be affected by said widening: And provided further, That nothing herein contained shall be held or construed to prevent any owner of property now existing on Arch street, from taking out the brick work of the front wall between the two windows on first floor, carrying the weight thereof on an iron beam, and putting in a bulk window, the said bulk window not to project beyond the building line."

Regulations of the
BUREAU OF BUILDING INSPECTION
in regard to
REINFORCED CONCRETE CONSTRUCTION

GENERAL REQUIREMENTS

Section 1. Definition. The term "reinforced concrete" in these regulations shall mean an approved concrete mixture in which steel is embedded in such a manner as to resist the tensile stresses and to add rigidity and strength to concrete in compression.

Section 2. Approved for all Types of Buildings. Reinforced concrete will be approved for all types of building construction, provided the design conforms with good engineering practice, and the working stresses do not exceed those herein specified. The construction shall meet the requirements of these regulations in all respects, and in addition shall conform to such other rules as may be issued by the Chief of the Bureau of Building Inspection.

Section 3. Construction Plans and Specifications.

1. The plans and specifications required to be filed with the Chief of the Bureau of Building Inspection shall be accompanied by stress computations and descriptions showing the general arrangement of the entire construction in all important details, including the size, length, and points of bending of all reinforcement, the qualities, proportions, and methods of mixing the materials used in the concrete, and the dead and live loads each floor is designed to carry.

2. All such plans and specifications shall be signed by the architect, engineer, contractor or person applying for the permit. In no case shall the construction deviate from the approved plans and specifications except by written consent of the Chief of the Bureau of Building Inspection.

SPECIFICATIONS FOR MATERIALS

Section 4. Quality of Concrete.

1. The concrete shall consist of a mixture of a plastic or viscous consistency of one part of cement to not more than six parts of aggregate, fine and coarse, either in the proportion of one part of cement, two parts of sand and four parts of stone, gravel or slag or in such proportion as to produce a maximum density. Such concrete shall develop a crushing strength of at least 2,000 lbs. per square inch at 28 days when made under laboratory conditions of manufacture; the materials and consistency being practically the same as that used in the field. Test specimens shall be removed from moulds as soon as well set and stored in damp sand until tested.

2. Concrete in the proportion of one part of cement to four and one-half parts of aggregate, which may be desirable for special work such as columns, shall develop a crushing strength of not less than 2,400 pounds per square inch at 28 days, and the working stress of such concrete may be increased 20 per cent. over that permitted elsewhere in this part.

3. Each test shall consist of a set of at least three duplicate specimens in the shape of cylinders with a height of double the diameter; or cubes having a least dimension of 6 inches. Cubes shall be tested standing

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on bed and 75 per cent. of the resulting test strength shall be assumed as the strength of the standard cylinder specimen 8 inches in diameter and 16 inches high. The average of the three tests shall be taken as the result for record. The smallest dimension of the test piece should be at least four times the size of the coarsest particle of stone.

4. In addition to these preliminary tests, which are necessary for the purpose of design, the Chief of the Bureau of Building Inspection may require additional tests to be made upon specimens cast during construction of the building. The test specimens shall be secured at such times and in such portions of the structure as the Inspector of the Bureau of Building Inspection may direct. This test concrete may be taken from the barrows as the concrete is being wheeled to place or from the forms after it is deposited. The results of such tests shall be considered in conjunction with the test of workmanship described in Section 47.

Section 5. Quality of Cement. All cement used in reinforced concrete shall be Portland cement meeting the requirements of the standard test specifications of the American Society for Testing Materials. Reports to be filed with the Bureau of Building Inspection.

Section 6. Quality of Fine Aggregate.

1. Fine aggregate shall consist of sand, crushed stone, or gravel, screenings, passing when a dry screen having ¼ inch diameter holes and not more than 6 per cent. passing a sieve having 100 meshes per lineal inch. It shall be clean and free from quicksand, vegetable loam, perishable organic matter, or other deleterious materials.

2. Fine aggregate shall always be tested. It shall be of such quality that mortar composed of one part Portland cement and three parts fine aggregate by weight, when made into briquettes shall show a tensile strength at least equal to the strength of 1:3 mortar of the same consistency made with the same cement and standard Ottawa sand, and shall show a tensile strength of at least 180 lbs. per square inch at the age of 7 days. If the aggregate be of poorer quality, the proportion of cement should be increased to secure the desired strength.

Section 7. Quality of Coarse Aggregate.

1. Coarse aggregate shall consist of crushed stone, gravel, or slag which is retained on a screen having ¼ inch diameter holes, and shall be graded in size from small to large particles. The maximum size shall be such that all the aggregate will pass through a 1¼ inch diameter ring. The particles shall be clean, hard, durable, and free from all deleterious material.

2. Gravel shall be free from clay or loam except such as naturally adheres to the particles. If clay or loam is in such quantities that it cannot be readily removed by dipping in water or brushing lightly with the hand, the gravel shall be washed. When bank-run gravel is used, it should be screened from the sand and remixed in the proper proportion for fine and coarse aggregate.

3. All slag shall be clean, air-cooled blast furnace slag, weighing not less than 75 pounds per cubic foot, and containing not more than 1.3 per cent. of sulphur as sulphides.

Section 8. Quality of Reinforcement. All steel used in reinforced concrete shall meet the requirements of the current Standard Specifications

for Billet-Steel Concrete Reinforcement Bars of the American Society for Testing Materials. No reinforcement produced from re-rolled rails or second-hand materials shall be used in any structure without the written permission of the Chief of the Bureau of Building Inspection. If such reinforcement be permitted, it shall meet the requirements of the current Standard Specifications for Rail-Steel Concrete Reinforcement Bars of the American Society for Testing Materials. Cold drawn steel wire made from open hearth billets of the grade of rivet steel or from Bessemer billets, may be used in floor and roof slabs, column hooping, and reinforcement for temperature and shrinkage stresses. It shall have an ultimate strength of not less than 85,000 lbs. per square inch and test specimens shall bend 180 degrees around their own diameter without fracture.

FACTORS CONTROLLING DESIGN

Section 9. Allowable Unit Working Stresses. In the design of reinforced concrete structures when the concrete is mixed in the proportions of 1:2:4, and satisfies the strength requirements of Section 4, the following working stresses for concrete and steel shall be used:

	Lbs. per Sq. in.
Extreme fibre stress on concrete in compression	650
Concrete in direct compression	500
Shearing stress in concrete when diagonal tension is not resisted by steel	40
Shearing stress in concrete when web reinforcement is proportioned to resist two-thirds of the external vertical shear	120
Bond stress between concrete and plain reinforcing bars	80
Bond stress between concrete and deformed bars	100
Tensile stress in steel reinforcement	16,000

Bearing on a concrete surface having a total area at least three times the area of the loaded portion may be taken at 37½ per cent. of the ultimate strength of the concrete, when all other stresses are properly provided for.

Compressive stress in steel as specified in Sections 26, 27 and 28 or in the ratio of the moduli of elasticity of steel to concrete

In continuous beams the extreme fibre stress in concrete in compression may be increased 15 per cent. adjacent to the supports.

In proportioning the section of concrete for shearing stresses, the effective depth from centre of compression area to centre of steel shall be used.

Stresses in concrete mixed in the proportions of 1:1½:3 in accordance with Section 4 may be increased 20 per cent. in excess of the above stresses.

Section 10. General Assumptions. As a basis for calculating the strength of beams and slabs, the following assumptions shall be made.

(a) A plane section before bending remains plane after bending.

(b) The modulus of elasticity of concrete in compression remains constant within limits of working stresses fixed in these regulations.

(c) The adhesion between concrete and reinforcement is perfect.

(d) Concrete has no value in resistance to tension.

(e) Initial stress in the reinforcement due to contraction or expansion in the concrete is negligible.

(f) The ratio of the moduli of elasticity of 1:2:4 stone or gravel concrete and steel in flexure shall be taken as 1:15.

(g) The ratio of the moduli of elasticity of 1:1½:3 stone or gravel concrete and steel in flexure shall be taken as 1:12.

The span length for beams and slabs shall be taken as the distance from centre to centre of supports, but need not be taken to exceed the clear span plus the over-all depth of beam or slab. Brackets shall not be considered as reducing the clear span in the sense here intended.

BENDING MOMENTS OF UNIFORMLY LOADED FLOOR AND ROOF SLABS

Section 11. Bending Moments of Slabs Supported on Two Sides. The bending moments of slabs due to uniformly distributed loads shall be taken as not less than:

1/8 WL, at centre when simply supported.
1/10 WL, at centre and continuous support when supported at one end and continuous at the other.
1/12 WL, at centre and intermediate supports when continuous over more than two supports.
W = Total distributed dead and live loads.
L = Length of span.

Section 12. Bending Moments of Slabs Supported on Four Sides. The bending moments of uniformly loaded slabs supported on four sides and reinforced in both directions shall be taken as:

1/8 WL, at centre in each direction when simply supported.
1/10 WL, at centre and continuous support when continuous over one support.
1/12 WL, at both centre and supports when continuous over two or more supports.

Section 13. Distribution of Loads. The distribution of loads on square and rectangular slabs supported on four sides shall be determined by the following formula:

$$r = \frac{l^4}{l^4 + b^4}$$

in which r = the proportion of the load supported by the transverse reinforcement.

l = length of slab.
b = breadth of slab.

If the length of the slab exceeds 1½ times its width, the transverse reinforcement shall be designed to carry the entire load.

BENDING MOMENTS OF UNIFORMLY LOADED BEAMS AND GIRDERS

Section 14. Term Beam Defined. The term *beam* as used in this section shall be understood to include the term girder, unless specific distinction be made.

Section 15. Beams with Simple or Continuous Supports. The bending moments of uniformly loaded beams shall be taken as:

1/8 WL, at centre when simply supported.
1/10 WL, at centre and over continuous support when supported at one end and continuous at the other.
1/12 WL, at both centre and supports when continuous over more than two supports.

Section 16. Beams Supporting Rectangular Slabs.

1. Beams supporting rectangular slabs reinforced in both directions, shall be assumed to take the proportions of load as determined by the formula in Section 13.

2. The bending moments of slabs, beams or girders, which are continuous for two spans only, shall be taken as 1/8 WL over the central support and 1/10 WL near the middle of the span.

GENERAL DESIGN REQUIREMENTS FOR BEAM AND SLAB CONSTRUCTION

Section 17. Special Members. The bending moments for slabs or beams with spans of unusual length or due to other than uniformly distributed loads, shall be more exactly computed according to accepted theory.

Section 18. Continuous Floor Construction. In continuous slabs, beams or girders, full provision shall be made for the negative bending moments over the supports by placing sufficient negative reinforcement near the top of the members to resist the stress. This reinforcement shall pass beyond the point of inflection in beams or girders and be anchored in the compression concrete of the member a sufficient distance to develop the full strength of the steel through bond stress. The critical section of continuous construction is over the support.

Section 19. Web Reinforcements in Beams.

1. Members of web reinforcement in beams shall be designed for diagonal tensile stresses, using the calculated vertical shearing stress as a measure of these tensile stresses. They shall not be spaced to exceed three-fourths of the depth of the beam in that portion where the web stresses exceed the allowable value of the concrete in shear. It shall be assumed that two-thirds of the external vertical shear is provided for by the steel in calculating the stresses in stirrups, diagonal web members, and bent up bars; and the remaining one-third of the shear shall be assumed as taken by the concrete, in accordance with Section 9.

2. Web members such as stirrups, when not rigidly attached to the longitudinal steel at both top and bottom, shall be carried around and bent over the longitudinal members or otherwise sufficiently anchored in the compression concrete to develop the tensile stresses existing in them. Diagonal members shall be rigidly attached to the longitudinal steel on the tension side. Stirrups at the ends of continuous girders shall be inverted with the free ends anchored in the compression concrete at the bottom of the beam. The length of stirrups or diagonals embedded in compression concrete shall be sufficient to develop their entire tensile stresses by adhesion.

Section 20. T Beams.

1. Where adequate bond is provided at junction between slab and beam, and the two are cast at the same time as a unit, the slab may be considered as an integral part of the beam, provided its effective width shall not exceed on either side of the beam one-sixth of the span length of the beam, nor be greater than six times the thickness of the slab on either side of the beam; the measurements being taken from line of intersection between slab and beam.

2. In beams with T sections the width of the stem only shall be used in calculating longitudinal shear and diagonal tension. An effective bond shall be provided at the junction of the beam and slab when the principal slab reinforcement is parallel to the beam, by the use of transverse reinforcement extending over the beam and well into the slab.

3. In the design of T beams acting as continuous beams, sufficient compression area shall be provided on the under side at the support, either by the use of properly designed brackets or by embedding additional compression steel in the concrete extending to the point of inflection.

Section 21. Minimum Thickness of Slabs. The minimum thickness of concrete floor slabs shall be 4 inches, and for roof slabs 3½ inches.

Section 22. Floor Finish. Cement or concrete floor finish shall not be considered in calculating the strength of floor members unless it be laid at the same time they are cast.

Section 23. Composite Floors. The design of composite floors consisting of rows of hard-burned terra cotta tile, concrete blocks, sheet steel, or other approved fire resistive material, separated by ribs or beams of reinforced stone, gravel, or slag concrete, shall conform to all the provisions of this part so far as they are applicable. The ribs shall be at least 4 inches wide. The tile or blocks shall be regarded only as fillers, and shall not be considered in the design except as dead load. If designed as a T-beam, the slab portion above the fillers shall be at least 2½ inches thick, and shall consist of the same mixture used for the ribs, and shall be cast at the same time; under these conditions it may be considered in the design of the ribs. Tile or concrete block fillers shall be laid with Portland cement mortar joints, and shall be thoroughly wet before the concrete is poured. The protection for steel bars in bottom of ribs shall be the same as for other beams.

To resist expansion stresses, reinforcement bars not less than ¼ inch diameter shall be placed in the concrete at right angles to the ribs and above the fillers, at intervals not exceeding 24 inches.

DESIGN OF COLUMNS AND WALLS

Section 24. Length of Columns. The length of columns shall be taken as the maximum unsupported length.

The unsupported length of columns shall not exceed fifteen times the least side or diameter, and in no case shall the least side or diameter be less than 12 inches. The length shall include any corbel or knee brace attached to the column.

Section 25. Columns Without Hoops. Axial compression in reinforced concrete columns without hoops, bands, or spirals, containing not less than ½ per cent., nor more than 3 per cent. of vertical reinforcement, secured against lateral displacement by steel ties placed not farther apart than fifteen diameters of the vertical rods, nor more than 12 inches, shall not exceed 500 pounds per square inch on the effective area of the concrete, plus 6,000 pounds per square inch on the vertical reinforcement. The percentage of reinforcement shall be calculated upon the effective area of the column, which is the area within the reinforcement. Steel ties shall be not less than ¼ inch in diameter or least dimension. At least four vertical bars shall be used in every reinforced column, and no bar shall have an area of less than ½ square inch.

Section 26. Columns With Hoops. Axial compression in reinforced concrete columns with not less than 1 per cent. of hoops or spirals (that is, a volume of steel equal to 1 per cent. of the volume of concrete within the hoops or spirals for a unit length of column) spaced not farther apart than one-sixth of the diameter of inclosed column, but in no case more than 3 inches, with not less than one nor more than 3 inches, with not less than one nor more than 4 per cent. of vertical reinforcement, shall not exceed 750 pounds per square inch on the effective area of the concrete, plus 9,000 pounds per square inch on the vertical reinforcement. The hoops or spirals shall be uniformly spaced, and shall be rigidly attached to at least four vertical bars in each convolution.

Section 27. Structural Steel and Concrete Columns. Axial compression in structural steel columns thoroughly encased in concrete having a minimum thickness of 4 inches and reinforced with not less than 1 per cent. of steel (that is, a volume of steel equal to 1 per cent. of the volume of concrete within the hoops) equally divided between vertical reinforcement and hoops or spirals spaced not more than 12 inches apart, may be taken at 16,000 pounds per square inch on the net section of the structural steel, no allowance being made for the concrete casing. The hoops or spirals shall be placed not nearer than 1 inch from the structural steel or nearer than 1½ inch from the outer surface of the concrete. The ratio of length to least radius of gyration of the structural steel section shall not exceed 120.

Section 28. Columns Constructed with Special Concrete. In reinforced concrete columns the compression on the concrete may be increased 20 per cent. when the fine and coarse aggregates are carefully selected and the proportion of cement to total aggregates increased to one part of cement to not more than four and one-half parts of aggregate, fine and coarse, either in proportion of one part of cement, one and one-half parts of sand and three parts of stone, gravel, or slag, or in such proportions as will secure the maximum density. The unit stress on the vertical reinforcement in such columns shall not exceed twelve times the unit stress on the concrete.

Section 29. Columns Eccentrically Loaded. Bending stresses in columns due to eccentric loads shall be provided for by increasing the section of concrete or steel so that the total unit stress shall not exceed the allowable working stress in flexure.

Section 30. Steel Base Plates. Suitable steel base plates or castings shall be provided at the bottom of columns to distribute the loads over the footings, and the vertical reinforcement bars shall bear squarely on these plates, or the reinforcing bars shall be carried down into an enlarged footing to distribute the load through bond stress.

Section 31. Walls. Exterior and interior bearing and non-bearing walls of reinforced concrete shall be securely anchored to all intersecting walls, columns, and floors, and the allowable compressive stress shall not exceed 250 pounds per square inch. The thickness shall be not less than two-thirds that specified for brick walls. All such walls shall be reinforced with steel running both horizontally and vertically. The amount of reinforcement shall be not less than 1/5 of 1 per cent. of the cross section of the wall, and shall be equally disposed near each face of the wall; except that in walls or partitions 8 inches or less in thickness the reinforcement may be placed as a single layer in the middle. Reinforcement shall not be spaced more than 18 inches apart. Additional reinforcement shall be placed around wall openings, and all vertical and horizontal reinforcement shall be wired or have other mechanical bond at intervals not exceeding 18 inches in either direction.

GENERAL PROVISIONS FOR DESIGN OF GIRDERLESS FLOORS OR FLAT SLABS

Section 32. Girderless Floors.

1. Girderless floors or flat slabs consisting of reinforced concrete slabs resting upon columns with flaring heads, with or without drop heads or column caps, and in which no beams or girders are used, except around openings in the floor or along walls, shall be designed in accordance with the bending moment coefficients and stresses specified in these regulations.

DROP CONSTRUCTION—FOUR-WAY SYSTEM

L = Centre to centre of columns of the longest of straight bands in inches.
L_1 = Edge to edge of capital head in inches.
w = Total dead andlive load per square foot.
d = Distance in inches from centre of gravity of centroid to centre of steel at the drop.
d^1 = Distance in inches from centre of gravity of centroid to centre of steel at the centre of slab.
"Centroid" s used in the sense of equivalent compressive area.
If drop construction is not used, $d = d_1$.
Sufficient depth of slab to be provided for shearing stresses as well as bending stresses.
Capital head = not less than 2/10 L.
Width of drop = 38/100 L.
Width of bands = 45/100 L.
— M = Moment at edge of capital head.
+ M = Moment at centre of span.

$$\text{Load carried by straight band} = \frac{\text{Total bay} - \text{Capital head}}{2} \times w.$$

$$-M = \frac{\text{Total bay} - \text{Capital head}}{2} \times \frac{w L_1}{12}$$

$$+M = \frac{\text{Total bay} - \text{Capital head}}{2} \times \frac{w L_1}{24}$$

Width of concrete to resist compression at edge of capital head = Width of drop.

Width of concrete to resist compression when negative moment $= -\frac{W L_1}{24}$ = Width of band.

Width of concrete to resist compression in centre of span = Width of band.

$$\frac{-M}{d \times 16000} = x$$

Place 66% of x in straight band
Place 43% of x in diagonal band } over capital head.

$$\frac{+M}{d_1 \times 16000} = x_1$$

Place 66% of x_1 in straight band
Place 43% of x_1 in diagonal band } in centre.

Twenty per cent. of steel of — M to be added to provide for negative bending over straight bands.
Two-way reinforcement same as 4-way reinforcement with the following exceptions:
Place 100% of x over capital head = — M
" 80% of x_1 in centre of straight bands = + M
" 50% of x_1 in centre between straight bands = + M_1
" 50% of x_1 in centre of straight bands = — M_1
All steel in centre of bands "4-way or 2-way reinforcement" of bays adjacent to wall to be increased 20% where such bands lack continuity.

COLUMNS FOR GIRDERLESS FLOORS

Section 33.

1. The column capital shall have diameter at the top in no case less than 0.2 L where L is the length of the longest side center to center of columns for square capitals. The thickness of the column capital at this diameter shall be not less than 1½. The slope of the column capital shall nowhere exceed an angle of 45 degrees with the vertical.

2. The depressed head or drop may be cast above the column capital and the width of this drop shall be 38/100 L and the depth of drop shall not be less than ⅔ the thickness of slab.

3. The width of bands shall be such as to properly cover the panel area but shall not be wider than 0.45 L.

4. Punching shear shall be calculated at the edge of the column shaft and shall not exceed 120 lbs. per square inch. In computing shearing stress for the purpose of determining resistance to diagonal tension a point shall be taken at a distance out from the column capital equal to the effective depth of the slab.

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5. Working stresses and coefficients shall in general comply with Sections 9 and 11 to 16, inclusive, of these regulations. In rectangular panels the short dimension shall not be less than 8/10 the long dimension. Interior columns shall be capable of resisting the unbalanced bending moment produced by the panel with live load adjacent to a panel without live load.

6. Wall columns supporting roof to be figured as taking 80 per cent. of the negative moment—M developed in the roof. Other wall columns to be figured as taking 40 per cent. of the negative moment—M above and below the floor considered. Bars for negative bending moment shall extend at least to the ¼ point of the span, and if the bars have a greater diameter than ¾ inch, special attention shall be given to bond and anchorage.—M= negative moment in slab over capital as cited previously in this section. Protect steel over capital head by one inch of concrete.

REQUIREMENTS FOR REINFORCEMENT

Section 34. External and Internal Defects. All reinforcement shall be free from excessive rust, scale, grease, paint or any coating which would tend to reduce or destroy the bond between the steel and the concrete. Bars shall also be free from injurious seams, slivers, flaws, and other mill defects. The weight of any lot of bars shall not vary more than 5 per cent. from the standard weight of the lot as given by manufacturers' handbooks.

Section 35. Placing and Spacing of Reinforcement. All reinforcement shall be accurately located and mechanically secured against displacement during the placing of the concrete. Reinforcement bars for slabs shall not be spaced farther apart than two and one-half times the thickness of the slab. The spacing of parallel bars in beams shall be not less than three diameters from centre to centre, nor less than one inch. The clear spacing between two layers of bars shall be not less than one inch. In restrained or cantilever construction reinforcement shall extend beyond the supports into adjacent construction for full and effective anchorage, except that when this is not practicable, anchorage shall be obtained by other means acceptable to the Chief of the Bureau of Building Inspection. Special reinforcement shall be provided to resist concentrated loads. Slabs reinforced in one direction only shall have shrinkage rods not less than ¼ inch in diameter placed above the reinforcement and spaced not over 2 feet apart. All reinforcement shall be assembled well in advance of the placing of the concrete, and shall be inspected and approved by the Chief of the Bureau of Building Inspection before concrete is deposited.

Section 36. Protection for Reinforcement. Steel reinforcement shall have a minimum protection of concrete on all sides as follows:

In columns and girders, 2 inches; in beams and walls, 1½ inches; and in floor slabs, 1 inch.

The steel in footings for walls and columns shall have a minimum protection of 4 inches of concrete.

Section 37. Splices in Reinforcement. Splices in reinforcement bars shall be designed to transfer the calculated stress at the joint either by bond and shear through the concrete, or by bearing between the steel. Splices at points of maximum stress shall be avoided where possible. Lap splices of bars shall be of sufficient length to develop the required stress in the joint without exceeding the bond stress permitted. In columns where necessary to splice vertical bars having areas in excess of 1¼ square inches, it shall be done by cutting the bars squarely at the ends and inclosing them in a close-fitting pipe sleeve, or uniting them by a threaded splice or other mechanical connection that will transfer the load from one to the other without stressing the adjoining concrete excessively. The middle point of such splices shall be within one foot above the floor level. Splices in column hooping, where necessary, shall be sufficient to develop the full strength of the hooping.

All buildings required under the Act of Assembly of 1903 to be of first-class construction shall be fire-proofed, and such fireproofing shall not be assumed to carry stress.

WORKMANSHIP FOR CONCRETE

Section 38. Mixing.

1. The separate ingredients of concrete shall be accurately measured, and thoroughly mixed in a manner to produce a homogeneous mass of uniform color and of such a viscous consistency that it will flow to all parts of the forms without separation of the coarse aggregate from the mortar.

2. Except when limited quantities are required, or when the conditions of the work make hand mixing preferable, mixing shall be done in a mechanical batch mixer from which a complete batch shall be discharged before another is received. All ingredients shall be mixed together for at least one minute, the mixer making at least 20 revolutions. In all cases, the mixing shall be continued until the consistency is constant.

Section 39. Depositing.

1. Concrete shall be deposited, thoroughly tamped and worked to place before initial set begins, and shall then be kept free from shocks and disturbances of every kind until it has fully hardened. Retempering of concrete after its initial set shall be prohibited.

2. When the work of placing concrete is suspended, all necessary grooves for joining future work shall be made before the concrete sets.

3. Before depositing new concrete upon concrete already set, the contact surface shall be roughened, cleaned of all laitance and loose material, and then drenched with water and slushed with a grout consisting of one part Portland cement and not more than two parts fine aggregate immediately before placing the fresh concrete. If a watertight joint is desired, or if granolithic is to be deposited on old concrete, it is necessary that a neat cement grout be used.

Section 40. Drying and Freezing.

1. When fresh concrete is exposed to rapid-drying conditions, precautions shall be taken to keep it moist for a period of at least seven days after being deposited. Where practical this shall be done by a covering of wet sand, burlap or some other equally effective method. Thorough wetting twice a day is recommended.

2. In freezing weather all materials used in making concrete, particularly the coarse aggregate, shall be heated, and precautions shall be taken to prevent the concrete freezing while being deposited; and thereafter it shall be kept above 40 degrees until the concrete has obtained its final set, but such period shall be not less than 72 hours.

Section 41. Joints.

1. Construction joints shall be avoided wherever practicable, but when they are necessary they shall be located at such sections as will least affect the structural strength and shall be made at right angles to the direction of principal compressive stress. In members of floor systems, joints shall be made within the middle third of the span where practicable. In columns, joints shall only be permitted at the bottom face of the lowest connecting floor members. Temperature changes and shrinkage during setting necessitate joints in independent walls at itervals of 50 to 80 feet when not otherwise provided for by effective reinforcement.

2. Girders, beams, and slabs shall not be cast upon freshly-formed columns until a period of 4 to 6 hours has elapsed to permit settlement.

Section 42. Construction of Forms.

1. Forms shall be substantial and unyielding, and care shall be exercised to make them as nearly water-tight as practicable.

2. Care shall be taken to insure that all debris is removed from forms, and that they are thoroughly greased or wetted before concrete is deposited in them. Beam forms shall be so designed that at least one side may be removed without disturbing the bottom portion of the forms and its supports; and column forms, so that they may be removed without disturbing beam and slab forms. Cleanout holes shall be provided in the bottom of column forms where necessary to insure the removal of wood chips or other debris.

Section 43. Removal of Forms.

1. The time for the removal of forms shall always be subject to approval by the Chief of the Bureau of Building Inspection.

Schedule

Bottom of slabs, spans of 6 feet	4 days
plus 1 day extra for each additional foot of span.	
Bottom of beams and girders of ordinary length	14 days
Beams of span of 20 feet	21 days
Sides of lintels, girders and beams	3 days
Columns	3 days
Thin walls	3 days

2. Girders of 25-foot span or over shall be considered as special cases and shall be subject to the inspection of the Chief of the Bureau of Building Inspection before removal of the supports.

3. Composite floors, same as for ordinary beams.

4. All reinforced concrete shall be carefully inspected to insure its soundness and reliability before main supports are removed.

5. No loads shall be placed upon a reinforced concrete floor before the removal of the form supports, which would in any way tend to overstress such supports or those below.

6. Special care shall be observed in removing forms when the concreting has been done in cold weather. Concrete which has frozen accidentally before setting shall be thawed and kept thawed until it is determined whether the cement will set. In this case, sufficient water shall be provided for the cement to hydrate during this action.

Section 44. General Requirements for Tests. All tests upon reinforced concrete materials or construction shall be made in accordance with the requirements of the Chief of the Bureau of Building Inspection.

Section 45. Inspection. Every reinforced concrete building shall be erected under the constant supervision of a reputable and competent inspector furnished by the owner or architect, and acceptable to the Chief of the Bureau of Building Inspection. It shall be the duty of the inspector to keep a daily record of the work done, to observe whether the materials employed and the methods of construction are in all respects in accord with the specifications filed with the Chief of the Bureau of Building Inspection, and the requirements of these regulations; and to make record of all variations therefrom. A copy of these daily reports shall be filed with the Chief of the Bureau of Building Inspection, who is empowered to stop any improper construction until its faults are corrected, or to cause the removal of any defective work which he may consider dangerous.

A set of plans shall be on file at the building upon which the Inspector of the Bureau of Building Inspection shall mark in ink the progress of the work, and state the time and dates on which concrete for each portion of the structure was deposited; and the Chief of the

Bureau of Building Inspection shall indicate thereon the date upon which the forms may be removed. Record shall also be made of the date upon which forms were actually removed.

Section 46. Cinder Concrete.

1. Cinder concrete may be used constructively as fire-proofing only for floors and roofs between steel beams, and for interior non-bearing walls or partitions.

2. Cinders shall be composed of hard, well-burned, vitreous clinker, free from sulphides, fine ashes and foreign matter. The use of gas-house, or locomotive cinders, or stove or heating furnace ashes is prohibited.

3. In the selection of cinders for concrete, care shall be exercised to insure that they carry only a small percentage of unburned coal or coke. The amount shall not exceed 15 per cent.

4. Cinder concrete in the proportions of 1:2:5 to qualify for use for fire-proofing, except when used at fill above the floor arch proper, shall develop an average crushing strength of not less than 800 pounds per square inch at 28 days, when tested in accordance with the method of test prescribed for stone concrete in Section 4.

5. The allowable extreme fibre stress in compression in cinder concrete slabs between steel beams shall not exceed 300 pounds per square inch. The ratio of the moduli of elasticity of 1:2:5 cinder concrete and steel shall be taken as 1 to 30.

6. Cinder concrete to be used in slabs only, and not over 8^1—0 spans.

Section 47. Test of Workmanship for Floor Construction.

1. Whenever the Chief of the Bureau of Building Inspection has doubt as to quality of materials or workmanship in any building, he may require the owner or contractor at his own expense to make such tests as will establish the safety of the construction before occupancy takes place.

2. The test shall be under the direction of the Bureau of Building Inspection, and shall show that the construction will safely sustain a load equal to twice the live load for which it was designed, for a period of 24 hours without injury or permanent deformation. In the test of a floor arch the load shall be applied to a typical arch of average span between beams. If less than a whole arch between girders is tested, the test section shall be cut apart or isloated from the rest of the arch before applying the load; such test section shall have a width of at least 4 feet, measuring parallel to the beams.

3. The load shall consist of such materials and shall be so placed as to form a uniformly distributed load over the entire area to be tested without arching effect. In case sand or similar material is used for loading, it shall be loose in bottomless bins, and not in sacks or packages of any kind. A complete record of loads and deformations shall be kept throughout the test.

4. At least 30 days shall have elapsed after removal of forms from concrete flooring before a test load is applied.

5. If the portion tested should fail to meet the requirement of this test, the Chief of the Bureau of Building Inspection may still approve the structure for use, and if necessary, tests shall be repeated on different portions to determine the critical load. The detail records of this test, and the results of the tests upon the samples of concrete used in the construction, shall be taken into consideration by the Chief of the Bureau of Building Inspection in determining the working load to be permitted. However, it shall be specifically understood that no sub standard construction shall be accepted by the Chief of the Bureau of Building Inspection, if in his judgment it is sufficiently defective to be unsafe for the purpose intended.

GEO. D. PORTER
Director

Approved, 8/30/15.

RESOLUTION

On May 26, 1913, the Bureau of Building Inspection resolved to permit the use of mass concrete for foundations of dwellings, in the proportions of 1:2:5, under the following conditions:

Crushed stone or trappe rock or pebbles to be used in the concrete, and not slag. Good Portland cement to be used.

Forms must be placed on both sides—bank side and cellar side—before placing concrete.

For a nine inch brick wall the concrete foundations shall be 12 inches thick, on footings 18 inches wide by 12 inches deep, with a corresponding increase in the size of footings where the soil conditions require it; for a thirteen-inch brick wall the concrete foundations to be 16 inches thick, on footings 18 inches wide by 12 inches deep, with a corresponding increase in size of footings where conditions of soil require it.

RESOLUTION

On June 12, 1913, the Bureau of Building Inspection resolved to permit the use of blast furnace slag in mass concrete for foundations of dwellings and buildings of similar light construction, in lieu of stone, in the proportions of 1:2:5.

RULES AND REGULATIONS

Governing the use and manufacture of Hollow Concrete Building Blocks in the City of Philadelphia.

1. Hollow concrete building blocks may be used for buildings six stories or less in height where said use is approved by the Bureau of Building Inspection: Provided, however, that such blocks shall be composed of at least one (1) part of Standard Portland cement, and not to exceed five (5) parts of clean, coarse, sharp sand or gravel, or a mixture of at least one part of Portland cement to five (5) parts of crushed rock or other suitable aggregate.

Provided further, That this section shall not permit the use of hollow blocks in party walls. Said party walls must be built solid.

2. All material to be of such fineness as to pass a one-half inch ring and be free from dirt or foreign matter. The material composing such blocks shall be properly mixed and manipulated, and the hollow space in said blocks shall not exceed the percentage given in the following table for different height walls and in no case shall the walls or webs of the block be less in thickness than one-fourth of the height. The figures given in the table represent the percentage of such hollow space for different height walls.

Stories	1st	2nd	3rd	4th	5th	6th
1 and 2	33	33				
3 and 4	25	33	33	33		
5 and 6	20	25	25	33	33	33

3. The thickness for the walls for any building where hollow concrete blocks are used shall not be less than is required by law for brick walls.

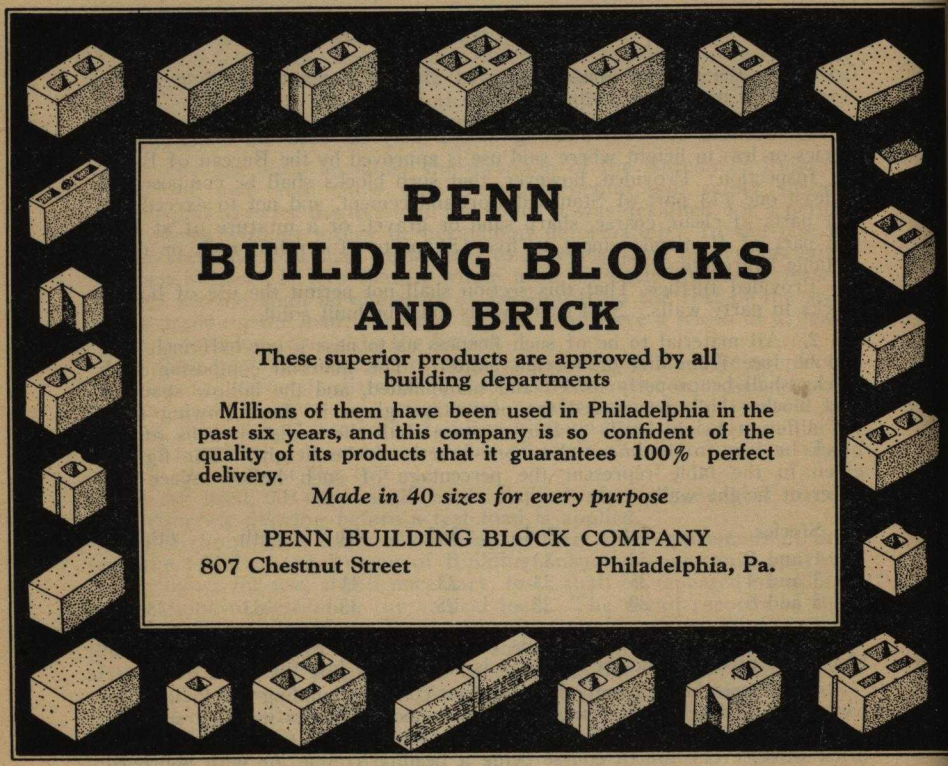
4. Where the face only is of hollow concrete building block, and the backing is of brick, the facing of hollow concrete blocks must be strongly bonded to the brick either with headers projecting four (4) inches into the brick work, every fourth course being a heading course, or with approved

ties; no brick backing to be less than eight (8) inches. Where the walls are made entirely of hollow concrete blocks, but where said blocks have not the same width as the wall, every fifth course shall extend through the wall, forming a secure bond. All walls, where blocks are used, shall be laid up in Portland cement mortar.

5. All hollow concrete building blocks before being used in the construction of any building in the City of Philadelphia, shall have attained the age of at least three (3) weeks.

6. Wherever girders or joists rest upon walls so that there is a concentrated load on the block of over two (2) tons, the blocks supporting the girder or joists must be made solid. Where such concentrated load shall exceed five (5) tons, the blocks for two (2) courses below, and for a distance extending at least eighteen inches each side of said girder, shall be made solid. Where the load on the wall from the girder exceeds five (5) tons, the blocks for three (3) courses beneath shall be made solid with similar material as in the blocks. Wherever walls are decreased in thickness the top course of the thicker wall to be solid.

7. Provided always, that no wall, or any part thereof, composed of hollow concrete blocks shall be loaded to an excess of eight (8) tons per superficial foot of the area of such blocks, including the weight of the wall, and no blocks shall be used that have an average crushing at less than 1,000 pounds per square inch of area at the age of twenty-eight (28) days; no deduction to be made in figuring the area for the hollow spaces.



8. All piers and buttresses that support loads in excess of five (5) tons, shall be built of solid concrete blocks for such distance below as may be required by the Bureau of Building Inspection. Concrete lintels and sills shall be reinforced by iron or steel rods in a manner satisfactory to the Bureau of Building Inspection, and any lintels spanning over four feet six inches in the clear shall rest on solid concrete blocks.

9. Provided, that no holiow concrete building blocks shall be used in the construction of any building in the City of Philadelphia, unless the maker of said blocks has submitted his product to the full test required by the Bureau of Building Inspection, and placed on file with said Bureau of Building Inspection a certificate from a reliable testing laboratory showing that samples from the lot of blocks to be used have successfully passed the requirements of the Bureau of Building Inspection, and filing a full copy of the test with the Bureau.

10. A brand or mark of identification must be impressed in, or otherwise permanently attached to, each block for purpose of identification.

11. No certificate of approval shall be considered in force for more than four months, unless there be filed with the Bureau of Building Inspection, in the City of Philadelphia, at least once every four months following, a certificate from some reliable physical testing laboratory showing that the average of three (3) specimens tested for compression, and three (3) specimens tested for transverse strength, comply with the requirements of the Bureau of Building Inspection of the City of Philadelphia; samples to be selected either by a Building Inspector or by the laboratory, from blocks actually going into construction work. Samples must not be furnished by the contractors or builders.

12. The manufacturer and user of any such hollow concrete blocks as are mentioned in this regulation, or either of them, shall, at any and all times, have made such tests of the cements used in making such blocks, or of each of these, at their own expense, and under the supervision of the Bureau of Building Inspection, as the Chief of said Bureau shall require.

13. The cement used in making said blocks shall be Portland cement, and must be capable of passing the minimum requirements as set forth in the "Standard Specifications for Cement" by the American Society for Testing Materials.

14. Any and all blocks, samples of which, on being tested under the direction of the Bureau of Building Inspection, fail to stand at twenty-eight (28) days the tests required by this regulation, shall be marked "condemned" by the manufacturer or user, and shall be destroyed.

15. No concrete blocks shall be used in the construction of any building within the City of Philadelphia until they shall have been inspected, and average samples of the lot tested, approved and accepted by the Chief of Building Inspectors.

SPECIFICATIONS GOVERNING METHOD OF TESTING HOLLOW BLOCKS

1. These regulations shall apply to all such new materials as are used in building construction in the same manner and for the same purposes, as stones, brick and concrete are now authorized by the Building Laws, when said new material to be substituted departs from the general shape and dimensions of ordinary building brick, and more particularly to that form of building material known as "Hollow Concrete Block," manufactured from cement and a certain addition of sand, crushed stone or similar material.

2. Before any such material is used in buildings, an application for its use and for a test of the same must be filed with the Chief of the Bureau

of Building Inspection. A description of the material and a brief outline of its manufacture and proportions of the materials used must be embodied in the application.

3. The material must be subjected to the following test: Transverse, Compression, Absorption, Freezing, and Fire. Additional tests may be called for when, in the judgment of the Chief of the Bureau of Building Inspection, the same may be necessary. All such tests must be made in some laboratory of recognized standing, under the supervision of the engineer of the Bureau of Building Inspection. The tests will be made at the expense of the applicant.

4. The results of the tests, whether satisfactory or not, must be placed on file in the Bureau of Building Inspection. They shall be open to inspection upon application to the Chief of the Bureau, but need not necessarily be published.

5. For the purposes of the tests, at least twenty (20) samples or test pieces must be provided. Such samples must represent the ordinary commercial product. They may be selected from stock by the Chief of the Bureau of Building Inspection, or his representative, or may be made in his presence, at his discretion. The samples must be of the regular size and shape used in construction. In cases where the material is made and used in special shapes and forms, too large for testing in the ordinary machines, smaller sized specimens shall be used as may be directed by the Chief of Building Inspection, to determine the physical characteristic specified in Section 3.

All types of construction profit alike by the insulative qualities of Cinder Block and Tile

The advantages inherent in Cinder Block and Cinder Tile—as manufactured by Straub and Bo processes—may be built into any type of construction—and give added value to any building.

These advantages—fire-resistance, heat-insulation, and sound-absorption as assential features of the wall itself—are widely utilized by architect and builder in bearing wall, backing, partition and foundation wall construction.

PHILADELPHIA PARTITION & BUILDING BLOCK CO.

28th and Ritner Streets - - Philadelphia

6. The samples may be tested as soon as desired by the applicant, but in no case later than sixty (60) days after manufacture.

7. The weight per cubic foot of the material must be determined.

8. Tests shall be made in series of at least five, except that in the fire tests a series of two (four samples) are sufficient. Transverse tests shall be made on full-sized samples. Half samples may be used for the crushing, freezing and fire tests. The remaining samples are kept in reserve, in case unusual flaws or exceptional or abnormal conditions make it necessary to discard certain of the tests. All samples must be marked for identification and comparison.

9. The Transverse test shall be made as follows: The samples shall be placed flat-wise on two rounded knife edge bearings set parallel seven inches apart. A load is then applied on top, midway between the supports, and transmitted through a similar rounded knife edge, until the sample is ruptured. The modulus of rupture shall then be determined by multiplying the total breaking load in pounds by twenty-one (three times the distance between supports in inches) and then dividing the result thus obtained by twice the product of the width in inches by the square of the depth in inches. $R = \frac{3\,w\,l}{2\,b\,d}$ No allowance should be made in figuring the modulus of rupture for the hollow spaces.

10. The Compression test shall be made as follows: Samples must be cut from blocks so as to contain a full web section. The sample must be carefully measured, then bedded flatwise in plaster of paris, to secure a uniform bearing in the testing machine, and crushed. The total breaking load is then divided by the area in compression in square inches. No deduction to be made for hollow spaces; the area will be considered as the product of the width by the length.

11. The Absorption test must be made as follows: The sample is first thoroughly dried to a constant weight. The weight must be carefully recorded. It is then placed in a pan or tray of water, face downward, immersing it to a depth of not more than one-half inch. It is again carefully weighed at the following periods: Thirty minutes, four hours, and forty-eight hours, respectively, from the time of immersion, being replaced in the water in each case as soon as the weight is taken. Its compression strength, while still wet, is then determined at the end of forty-eight hours' period, in the manner specified in Section 10.

12. The Freezing test is made as follows: The sample is immersed, as described in Section 11, for at least four hours, and then weighed. It is then placed in a freezing mixture or a refrigerator, or otherwise subjected to a temperature of less than 15 degrees F. for at least 12 hours. It is then removed and placed in water, where it must remain for at least one hour, the temperature of which is at least 150 degrees F. This operation is repeated ten (10) times, after which the sample is again weighed while still wet from the last thawing. Its crushing strength should then be determined as called for in Section 10.

13. The Fire test must be made as follows: Two samples are placed in a cold furnace in which the temperature is gradually raised to 1,700 degrees F. The test piece must be subjected to this temperature for at least 30 minutes. One of the samples is then plunged in cold water (about 50 degrees to 60 degrees F.) and the results noted. The second sample is permitted to cool gradually in air, and the results noted.

14. The following requirements must be met to secure an acceptance of the materials: The Modulus of Rupture for concrete blocks at 28 days old must average one hundred and fifty and must not fall below one hundred in any case. The ultimate compressive strength at 28 days must average one thousand pounds per square inch and must not fall

below seven hundred in any case. The percentage of absorption (being the weight of water absorbed divided by the weight of the dry sample) must not average higher than 15 per cent., and must not exceed 20 per cent. in any case. The reduction of compressive strength must not be more than thirty-three and one-third per cent., except that when the lower figure is still above one thousand pounds per square inch the loss in strength may be neglected. The freezing and thawing process must not cause a loss in weight greater than ten per cent., nor a loss in strength of more than thirty-three and one-third per cent.; except that when the lower figure is still above one thousand pounds per square inch, the loss in strength may be neglected. The Fire test must not cause the material to disintegrate.

15. The approval of any material is given only under the following conditions:

(a) A brand mark for identification must be impressed on, or otherwise attached to, the material.

(b) A plant for the production of the material must be in full operation when the official tests are made.

(c) The name of the firm or corporation and the responsible officers must be placed on file with the Chief of the Bureau of Building Inspection, and changes in same promptly reported.

(d) The Chief of the Bureau of Building Inspection may require full tests to be repeated on samples selected from the open market when, in his opinion, there is any doubt as to whether the product is up to the standard of these regulations, and the manufacturer must submit to the Bureau of Building Inspection, once in at least every four months, a certificate of tests showing that the average resistance of three specimens to cross breaking and crushing are not below the requirements of these regulations. Such tests must be made by some laboratory of recognized standing on samples selected either by a Building Inspector or the laboratory, from material actually going into construction, and not on those furnished by the manufacturer.

(e) In case the results of tests made under this condition (d) should show that the standard of these regulations is not maintained, the approval of said blocks will at once be suspended or revoked.

BUILDING REGULATIONS.

For the Parkway between Broad street and Eighteenth street.

No building, any portion of which may come within the boundary lines of the Parkway between Broad street and Eighteenth street or within two hundred feet therefrom, shall hereafter be erected, altered or used except in conformity with the following regulations:

1. The main cornice line of every such building, except a church fronting on or facing toward the Parkway shall not exceed in height above the street level three times the width of its facade fronting on or visible from any point within the boundaries of the Parkway or in any event two hundred and thirty feet between Broad and Seventeenth streets and two hundred feet between Seventeenth and Eighteenth streets, and no other portion of said building, except pediment or attic wall, shall exceed the height of said cornice, unless the portion or portions above said cornice line shall recede from the plane of each facade of said building at least as far as said portion or portions extend above said line. No portion of such building, except a church, shall in any case exceed two hundred and sixty-eight feet in height above the street level between Broad and Seventeenth streets and two hundred and forty-five feet above said level between Seventeenth and Eighteenth streets.

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

2. No such building erected on a lot abutting on the Parkway shall be used for a stable, a garage or for any manufacturing purpose or for the display of bill-board or roof sign.

3. No such building shall be erected or altered, until the plans therefor have been approved by the Art Jury, and no sign, notice or advertisement of any kind, visible from any point within the boundaries of the Parkway, shall be displayed thereon, unless the design and location of said sign, notice or advertisement have been similarly approved. No permit for such erection or alteration shall be issued, until the approval of the Art Jury has been obtained, and the erection or alteration shall conform to the design, location and plans approved.

BUILDING REGULATIONS.

For the Parkway and Logan Square between Fairmount Park and Eighteenth street.

No building, any portion of which may come within the boundary lines of the Parkway or Logan Square between Fairmount Park and Eighteenth street or within two hundred feet therefrom, shall hereafter be erected, altered or used except in conformity with the following regulations:

1. The main cornice line of every such building, except a church, shall not exceed in height above the street level the width of its facade fronting on the Parkway Drive or facing toward the Parkway or Square or in any event eighty feet and no other portion of said building, except pediment or attic wall, shall exceed the height of said cornice, unless the portion or portions above said cornice line shall recede from the plane of each facade of said building at least as far as said portion or portions extend above said line. No portion of such building, except a church, shall in any case exceed one hundred feet in height between Fairmount Park and the Crescent or one hundred and sixty feet in height between the Crescent and Eighteenth street.

2. No such building erected within the boundary lines of the Parkway or Square or on a lot abutting thereon shall be used for a stable, a garage or for any manufacturing, industrial or commercial purpose or for the display of a bill-board or roof sign.

3. No such building shall be erected or altered until the plans therefor have been approved by the Art Jury, and no sign, notice or advertisement of any kind, visible from any point within the boundaries of said Parkway or Square, shall be displayed thereon, unless the design and location of said sign, notice or advertisement have been similarly approved. No permit for such erection or alteration shall be issued, until the approval of the Art Jury has been obtained, and the erection or alteration shall conform to the design, location and plans approved.

Section 2. The Fairmount Park Commissioners may, in its discretion, pending the completion of the Parkway, extend the time within which any such building, now actually used for a stable, a garage or for any manufacturing, industrial or commercial purpose may continue to be so used.

Section 3. Any owner, tenant or occupant of a building, responsible for its erection, alteration or use in violation of any of the foregoing regulations, shall be liable to a penalty of not less than five dollars nor more than twenty-five dollars, to be recovered for the use of the City before any magistrate as debts of like amount are now recoverable, and, if the portion of such building erected, altered or used or the sign, notice or advertisement displayed in violation of any of said regulations is not removed within five days after the imposition of the penalty, the person offending shall be liable to a further penalty of twenty-five dollars a day, to be recovered as aforesaid, for every day after the expiration of said period of five days, during which such portion of the building, sign, notice or advertisement remains unremoved.

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BUREAU OF BUILDING INSPECTION

Department of Public Safety

City of Philadelphia

PROTECTIVE THEATRE FIRE CURTAINS

FOR PROSCENIUM OPENINGS 30 FEET OR MORE IN WIDTH

1. General Requirements.

The proscenium opening between auditorium and stage shall have a curtain made of incombustible materials, constructed and installed to lap the masonry opening not less than eighteen (18) inches on each side and two (2) feet at the top, and to intercept flame and smoke and prevent glow from a severe fire on the stage from showing on the auditorium side for a sufficient length of time to permit the safe exit of all persons from the auditorium. The period of protection shall be taken as not less than fifteen (15) minutes. The emergency closing of the curtain in case of fire shall be effected by gravity in less than one (1) minute from the full open position, but the last six (6) feet of travel shall require not less than five (5) seconds.

2. General Design of Frame.

The curtain shall have a rigid framework of steel, covered with asbestos cloth on both the auditorium and stage sides.

The curtain shall in no case have a thickness of less than five (5) inches nor less than one one-hundred-twentieth (1/120) of its span.

The framework shall have interior members of tubes, structural shapes, bars, or rods of steel. The horizontal members to be spaced not more than eight (8) feet apart and the vertical members not more than ten (10) feet apart.

The bottom of the curtain shall have a yielding pad of incombustible material not less than three (3) inches thick to form a seal against the floor.

3. Covering.

Both the auditorium and stage sides of the framework shall be covered with a brass wire reinforced close-woven asbestos cloth. The cloth shall have a content of ninety-five (95) per cent. asbestos, and shall weigh not less than three (3) pounds per square yard. All strips shall be in one continuous length the full height of the curtain. The strips of cloth shall be lapped not less than an inch and sewed with two lines of stitching of asbestos thread, which shall be of the same, or greater, strength than the yarns of the cloth.

The asbestos cloth covering shall be secured by a clamping strip of 1¼ x 5/16 half oval iron, bolted eight (8) inches on centers to the outside members of the frame.

4. Painting.

The asbestos cloth on both sides of the curtain shall, after erection, be painted with a mineral paint composed of four (4) parts of casein to ten (10) parts of concentrated solution of sodium silicate, to which may be added twenty (20) parts of pigment. The paint shall be applied hot and be well brushed into the cloth.

5. Curtain Guides.

The curtain shall be guided throughout its travel by rigid steel guides. These guides shall be built integral with the smoke pockets, and shall extend from the stage level to a height of twice the height of the proscenium opening plus five (5) feet. The smoke pocket shall be not less than a nine (9) inch channel and a fourteen by a quarter (14 x ¼) inch steel plate, or equivalent section. Such guides and smoke pockets shall be securely bolted in place every four (4) feet to approved anchors built into wall, or three-quarters (¾) inch bolts through the wall, and designed to form a stop between the curtain and the wall to prevent smoke and flame from passing around the edges of the curtain.

6. Lifting Cables and Rigging.

The curtain shall be hung on steel lifting cables, one at each end, and one at intermediate points not over ten (10) feet apart. These cables shall be one-half (½) inch in diameter, and shall be attached to drums twenty (20) inches in diameter which are keyed fast to a heavy rolled operating shaft.

The operating shaft shall run in machined and self-lubricating journals, one on each side of each drum and one at each end.

The journals shall rest on substantial fireproof supports.

The curtain shall be balanced by two counterweights only to such an extent that when released it shall descend by gravity. Each counterweight shall be supported by two lifting cables of one-half (½) inch diameter, which shall be attached to drums keyed fast to operating shaft. Counterweight frame to be made with top and bottom weights connected with one (1) inch tie rods to receive counterweight. Counterweights to operate on two and one-half by two and one-half by three-eighths (2½ x 2½ x ⅜) inch tee bar tracks, secured to proscenium wall by two and one-half by three-eighths (2½ x ⅜) inch "U" brackets. Each bracket is to be double-bolted to wall. Counterweight guides to be set on the stage floor and continue for the full travel of the counterweight frame plus five (5) feet. The counterweight tracks at the stage floor shall be enclosed with a sheet metal guard of number sixteen (16) metal to a height of eight (8) feet above the stage floor.

7. Operating Equipment.

The curtain shall be normally operated at least once during each performance.

The normal operation of the curtain is to be the raising and lowering electrically from one station by three-eighths (⅜) inch steel tiller cable, controlling operating switch, and shall be equipped with travel and over-travel limit stops. The emergency lowering of the curtain shall be by gravity obtained by under-balancing the curtain with reference to the counterweight.

Emergency control stations shall be located at each side of the proscenium opening at the stage floor, and there shall also be at least three quick-acting heat operated release devices for automatically closing the curtain.

For checking the automatic lowering of the curtain an oil dash pot of five (5) inch diameter cylinder, machine bored, and fitted with plunger and rod, with a sixteen (16) inch sheave on top of rod, with necessary cable for checking the curtain six (6) feet above floor and then allowing curtain to lower slowly and settle easily on the stage floor.

8. Hoisting Machine.

The hoisting machine to be of simple design and positive in operation; to be connected b roller chain and sprockets keyed fast to operating shaft. Machine to have machine-cut gears with bronze worm and steel worm, direct-connected to a three (3) horsepower electric motor. All gears and worms to be enclosed in self-lubricating housings, all mounted on a single base plate.

9. Approval of Plans and Installations.

Complete details of a proposed curtain and lifting mechanism shall be submitted to the Bureau of Building Inspection, and approval obtained before the installation or erection of any proscenium curtain is begun. The completed installation shall be similarly approved, after operating tests, before any theatre is opened for public performances.

Approved June 22, 1927. G. W. ELLIOTT
Director, Dept. of Public Safety

RULES AND REGULATIONS

Governing the Installation of Asbestos Theatre Curtains, and Minor Details, in the City of Philadelphia.

1. The proscenium wall (between the stage and the auditorium) shall be a substantial self-supporting masonry or other fireproof wall, with as few openings in it as possible, and shall extend from the ground up and through the highest roof and four feet above same.

2. Any openings, other than the proscenium opening, through this wall shall be protected by positive acting, self-closing, fire-proof doors constructed in accordance with the requirements of the Department of Public Safety; these doors shall be either hinged at the side to swing or run on an overhead rail to slide sideways. If they swing, they shall be made self-closing by means of a heavy weight and phosphor bronze chain and pulley arrangement, the pulley being guarded so that the chain cannot jump off; if they slide, the overhead rail shall have a sharp inclination so as to make them self-closing, and shall be arranged so that the door cannot jump the track or jam. No doors that slide up or down and no fusible link arrangement for holding doors open will be allowed. All of these doors shall be kept free from locks or fastenings of any kind and shall be so that they can be opened from either side at any time.

3. Across the proscenium opening the wall shall be carried up through the stage floor and to the under side of the top flooring.

4. The proscenium curtain shall be composed of asbestos of long, tough, flexible fibre, twisted and wrapped upon substantial brass wire thread, and woven into a close, even cloth, three (3) feet wide. The strips to be lapped not less than an inch and sewed with two lines of asbestos and brass wire thread stitching. All strips shall be in one continuous length the full height of the curtain. There shall be at least four (4) laps of the cloth at the top and at the bottom of the curtain to form pockets for the top and bottom bars, the laps to have at least three (3) lines of the above mentioned stitching. The curtain shall be lapped on the sides of a sufficient width to form a continuous reinforcement for the guide clips, and be stitched in a proper manner.

The curtain shall be at least thirty-six (36) inches wider than the proscenium masonry opening and at least two (2) feet higher than the highest point of the proscenium arch. It shall have wrought iron or rolled steel top and bottom bars proportional in size to the width of the curtain, but not less than one (1) inch by two and one-half (2½) inches. The top and bottom bars shall be connected by four (4) steel wire cables 3/16 inch diameter to support the weight of the bottom bar. The curtain guide clips at the sides shall be constructed of substantial bent brass attached to the curtain and encircling lignum-vitæ blocks which in turn encircle the standing cables. Where the clips are attached to the curtain, the curtain shall be reinforced both sides with pieces of sheet metal riveted

to it. The guide clips shall be spaced not over 18 inches centre to centre. The standing cables shall be of steel ⅜-inch diameter with their upper ends attached to wrought iron brackets fastened to the proscenium wall at a line at least twice the height of the curtain plus 5 feet above the level of the stage. The standing cables shall pass through metal bushed holes in the stage floor, and have suspended from their lower ends weights of sufficient size to keep them taut. The curtain shall be supported by steel lifting cables, one at each end, and one at intermediate points not over ten (10) feet apart. These cables shall be ½-inch diameter and shall be attached to drums keyed fast to a heavy rolled steel operating shaft. The operating shaft shall run in machined and self-lubricating journals, one on each side of each drum and one at each end. The journals shall rest on substantial fire-proof supports. The curtain shall be balanced by a counter-weight only to such an extent that when it is tripped it shall descend in 15 seconds. The manner of tripping the curtain shall be by means of 5/16-inch steel cables, one on each side of the curtain; these, whenever pulled, shall release the curtain and allow it to descend. The trip cables shall run from the stage level up along each side of the curtain and pass over the gridiron to the releasing clutch on the operating shaft; they shall be placed in such a manner that they can be operated from the stage level, fly-galleries and gridiron at any time, and the apparatus must be so that the curtain will be positively self-descending. There shall be attached to the top bar of the curtain substantial emergency chains, of three-eighths (⅜) inch wrought iron, spaced midway between the lifting cables and securely fastened at their upper ends to eye-bolts through the proscenium wall at proper height. The curtain shall operate in guides, bolted every two (2) feet, with not less than ½-inch bolts, through the proscenium wall; these guides shall run from the stage level to a height of twice the height of the curtain plus 5 feet, and shall be constructed, each of one 8-inch by 6-inch by ½-inch angle and one 3-inch by 3-inch by ½-inch angle, or equivalent section, riveted together to form a Z bar. All apparatus connected with the curtain or its operation shall be of metal; where anything is secured to parts of the building, these parts shall be substantial and incombustible, and all curtain connections shall be secure and fire-proof. Any paint used on the curtain shall be incombustible. No flaps or doors shall be allowed in the curtain, and the curtain and its apparatus shall be maintained in perfect repair and working order at all times. The curtain to be operated at least once during each performance, not counting the raising at the beginning and the lowering at the end of the performance.

5. The border decorations around the proscenium opening, at least as far as 12 inches from the curtain, shall be fire-proofed. No hanging curtains that are not fire-proofed shall be placed on the auditorium side of the proscenium opening, or in any case nearer than 10 inches to the asbestos curtain.

6. The vertical border lights at the proscenium shall be located inside the asbestos curtain and in substantial metal receptacles, and shall be permanently fixed in position. Hinged or movable border lights will not be allowed under any circumstances, and the receptacle for the border lights shall be absolutely clear in every way from any possible contact with the curtain.

7. Every stage shall have a skylight over it at least one-eighth (⅛) the area of the stage, and built in accordance with the requirements of the present building laws for new theatres.

8. All stage-scenery, woodwork, curtains or decorations shall be fire-proof, or shall be treated with some approved non-combustible material, so as to render them safe against any rapid spread of fire, and shall be

constantly maintained to the satisfaction of the Department of Public Safety. This applies to visiting companies or shows, as well as local companies.

9. A system of sprinklers, to be approved by the Department of Public Safety shall be erected and maintained all over the stage portion of the building, including the rigging-loft, fly-galleries, cellar under stage, dressing-rooms, shops, property-rooms, storage-rooms and over the proscenium arch; and also if there is a cellar under any portion of the building besides the stage, this must be provided with sprinklers as aforesaid.

10. The cellar under the stage and under any other part of the building shall be kept clean and free from non-fire-proof material.

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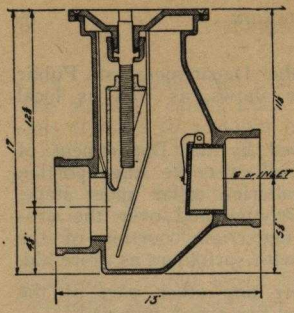

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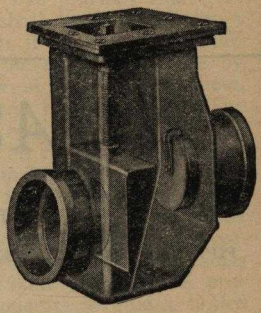

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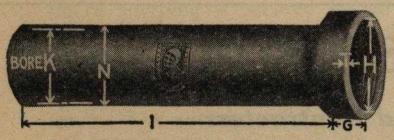

Figure 271

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City of Philadelphia

THE PLUMBING CODE

Rules and Regulations Governing Registration and Licensure of Master and Journeymen Plumbers; House Drainage, Ventilation and Cesspools in the City of Philadelphia, 1921. In Pursuance of the Act of Assembly Approved June 7, 1911.

REGISTRATION FOR INSTITUTIONS, ETC.

Rule 1. A person upon presenting satisfactory proof of his ability may be registered as a master plumber for the care, alteration or addition of the drainage system of a designated manufacturing or mercantile establishment, institution, hotel, etc., where it is necessary to have a continual service of a master plumber, and receive a certificate of registry, but in no case shall a person be permitted to do any plumbing or drainage work in any building or buildings other than that for which he is registered, unless he has first secured a place of business, as provided for in Section 2 of the Act of Assembly approved June 7, 1911.

CERTIFICATES MAY BE REVOKED

Rule 2. The certificate of registry granted under the Act of Assembly (June 7, 1911) may be suspended or revoked by the Bureau of Health, when a master or journeyman plumber, firm or corporation, or the registered representative thereof shall violate any of these rules and regulations, and shall refuse or neglect to make the necessary corrections to work not approved by the Bureau of Health, within a reasonable time after notification thereof, or who shall permit the use of his, their or its name, by a person or persons for the purpose of obtaining a permit or permits to do plumbing and drainage work.

DELINQUENT LIST

Rule 3. Failure on the part of a master plumber to make application for the inspection of any drainage work installed by him, application for final inspection or for the violation of any of the rules and regulations of the Board of Health, governing house drainage, and failure to correct the fault after notification, shall be deemed sufficient cause to place the name of such master plumber on the delinquent list, until he has complied with said regulations and rules.

Any attempt on the part of a master plumber or plumbers to construct or alter a system of drainage or any part thereof during the time his or their names appear on said delinquent list, will subject him or them to prosecution.

PLANS AND SPECIFICATIONS

Rule 4. The drainage of all buildings, public or private, and all alterations, extensions and additions to drainage systems shall be executed in accordance with plans and specifications previously approved in writing by the Bureau of Health.

FILING OF PLANS AND SPECIFICATIONS

Rule 5. There shall be separate plans placed on file in the office of the Bureau of Health for each building, public or private, accompanied by specifications describing the drainage of said buildings on the blanks, prescribed and furnished for this purpose, showing the size and kind of pipes, traps, water closets, fixtures, etc., to be used, and must show partitions and method of ventilating water closet apartments. Plans must be drawn legibly, in ink, and old work shall be shown in red ink.

OWNERS TO SIGN AND FURNISH PLANS

Rule 6. All plans and specifications for drainage shall be signed in person, and furnished by the owner of a building for which said plans are submitted for approval, and shall be prepared by the architect, where one is employed, except when good and sufficient reason is given, then plans and specifications may be signed and furnished by a duly authorized agent or attorney.

CHANGE IN PLANS

Rule 7. No change will be permitted in plans and specifications after they have been approved, unless application is first made in writing by the owner or a duly authorized agent or attorney, and the proposed change or amended plans have been submitted and approved in writing by the Bureau of Health.

PLANS TO BE SUBMITTED BY THE PLUMBERS

Rule 8. Plans and specifications for drainage shall be submitted to the Bureau of Health for approval by the registered master plumber, whose name, business address and register number shall be inserted in the space on the specifications provided for that purpose, and no plan will be approved or accepted by the Bureau of Health without said name, address and registered number.

APPROVAL OF PLANS

Rule 9. Plans will be approved or rejected within twenty-four (24) hours, when practicable, and under no circumstances will a delay beyond ten (10) days be permitted.

A certificate of approval will be issued in writing when a plan is deemed satisfactory by the inspector of house drainage.

NO VERBAL APPROVAL TO BE GIVEN

Rule 10. Under no circumstances whatever shall a verbal approval or permission given by any one be considered a justification for any deviation from the approved plans, or the violation of any of the rules and regulations governing house drainage.

BLANKS FOR DRAWINGS

Rule 11. Blanks for drawings and specifications for drainage will be furnished on application at the office of the Bureau of Health. One vertical drawing will be sufficient for a building where it can be made to show all the work: if the work is intricate and cannot be shown by one drawing, two or more shall be made.

A ground plan of the building showing the position of the main house and branch drains shall, in all cases, be submitted.

DRAINAGE OF BUILDINGS ERECTED PRIOR TO 1911

Rule 12. Whenever it shall come to the knowledge of the Bureau of Health or complaint in writing shall be made by any citizen that the plumbing or drainage in any building has become a nuisance or is con trary to the provisions and requirements of the Act (June 7, 1911), or the ordinances of the city, or is of faulty construction or liable to breed disease or endanger the health of the occupants or upon the request of any owner or occupant of any building fitted with plumbing or drainage prior to the passage of the Act (June 7, 1911), then the Bureau of Health shall direct the proper officer to examine the plumbing or drainage in any such building, and the said officer shall make a drawing of the plan of said plumbing, drainage and sewer and ventilating shaft connections. He shall report his findings in writing to the Bureau of Health and suggest such changes as are necessary to make the same conform to the rules governing such matters.

The Bureau of Health shall thereupon notify the owner or agent of any such building of the changes which are necessary to be made in said plumbing or drainage. Said changes shall be made within the time fixed by the Bureau of Health, and upon refusal or neglect to obey such orders the Bureau of Health shall institute legal proceedings to have such changes made, and said nuisance abated by action before a justice of the peace or court of record, in which said action the owner or agent of said building may show in defense that the plumbing or drainage was not a nuisance or was not of faulty construction or out of repair, and in case of a building constructed subsequent to the passage of the Act (June 7, 1911), said plumbing or drainage was not contrary to the provisions and requirements of the Act (June 7, 1911), or ordinances of the city.

SEPARATE DRAINAGE

Rule 13. The entire drainage system of each lot and building must be separate and independent of that of any other lot or building, and shall be separately and independently connected with the public sewer in the street, fronting said lot or building, where one is provided, and where there is no sewer in the street and it is necessary to construct a private sewer to connect with one on an adjacent street, such plans may be used as may be approved by the Board of Health, but in no case shall a joint drain be laid in cellars parallel with street or alley.

MAIN HOUSE DRAIN

Rule 14. The main house drain shall be not less than four (4) inches in diameter, and the fall shall be not less than one-fourth (¼) inch per foot, except by special permission of the Bureau of Health, when it is shown that one-fourth (¼) inch fall per foot is impossible. It shall be laid in a trench cut at a uniform grade, or it may be con-

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structed along the foundation walls above the cellar floor, resting on nine (9) inch brick piers laid in cement mortar (said piers to be not more than seven (7) feet apart), or it may be suspended from the floor by heavy iron hangers placed at intervals not greater than seven (7) feet. The use of pipe hooks, gas-pipe or iron driven into walls for supporting drains is prohibited.

MATERIAL OF DRAINS

Rule 15. All main house drains laid beneath the ground inside of buildings, or beneath the cellar floor, shall be plain cast iron pipe with well leaded and caulked joints, and shall extend to a point at least ten (10) feet beyond the foundation walls.

All other drain, soil or vent pipes connected with the main drain or any of its branches underground or beneath the cellar floor, shall be plain cast-iron pipe. All iron pipes laid underground for drainage purposes shall be of cast iron.

If the main house drain or any of its branches, soil, waste or vent pipes are above the cellar floor, or above ground, they may be of plain cast-iron pipe, galvanized lap welded wrought iron, galvanized steel or brass pipe of the weights prescribed.

TERRA-COTTA PIPE

Rule 16. Where the ground is of sufficient solidity for a proper foundation, cylindrical terra-cotta pipe of the best quality free from flaws, splits or cracks, perfectly burned and well glazed over the entire inner and outer surfaces, may be used if laid on a smooth bottom with a special groove cut in the bottom of the trench for each hub, in order to give the pipe a solid bearing on its entire length, and the soil well rammed on each side of the pipe. The spigot and hub ends shall be concentric. The space between the hub and pipe must be thoroughly filled with cement mortar made of equal parts of the best Portland or American natural cement and bar sand thoroughly mixed dry and enough water afterwards added to give proper consistency. The mortar must be mixed in small quantities and used as soon as made. The joints must be carefully wiped out and pointed, and all mortar that may be left inside removed and the pipe left clean and smooth throughout, for which purpose a swab may be used. Terra-cotta pipe must not be laid closer than ten (10) feet to any exterior wall of a building or less than three and one-half (3½) feet below the surface of the ground, nor will it be allowed in bad or made ground, or close to well used for water supply.

COATING FOR CAST-IRON PIPES

Rule 17. After the test has been applied and approved by the inspector, cast-iron drain, soil, waste and vent pipes may be coated, but in no case shall any coating be applied to cast-iron pipe for drainage until the test has been applied and approved.

ARRANGEMENT OF DRAIN, SOIL, WASTE AND VENT PIPE

Rule 18. The arrangement of drain, soil, waste and vent pipes shall be as direct as possible, all changes in direction on horizontal pipes shall be made with Y branches, one-sixteenth (1/16) or one-eighth (⅛) bends. Where the said pipes are vertical they shall extend in a straight line

from the basement to a point at least two (2) feet above the highest part of the building; where it is impossible to maintain a straight line, offsets may be used, which must have an angle of not less than forty-five (45) degrees to the horizontal. Vertical soil or waste pipes receiving the discharge of a fixture or fixtures on any floor above the first shall be extended in full calibre at least two (2) feet above the highest part of the building, but shall not open near a window or shaft ventilating living rooms.

SIZE OF MAIN HOUSE DRAINS

Rule 19. The size of the main house drain shall be determined by the total area of the buildings, and paved surfaces to be drained according to the following table, if iron pipe is used. If the pipe is terra-cotta, the diameter shall be one size larger for the same amount of drainage area:

Diameter	Fall ¼ in. per ft.	Fall ½ in. per ft.
4 inches,	1,800 sq. ft. drainage area.	2,500 sq. ft. drainage area
5 inches,	3,000 sq. ft. drainage area.	4,500 sq. ft. drainage area
6 inches,	5,000 sq. ft. drainage area.	7,500 sq. ft. drainage area
8 inches,	9,100 sq. ft. drainage area.	13,600 sq. ft. drainage area
10 inches,	14,000 sq. ft. drainage area.	20,000 sq. ft. drainage area

The main house drains may be decreased in diameter beyond a rain water conductor or surface inlet, by the permission of the Bureau of Health, when the plans show that conditions are such as to warrant such decrease, but in no case shall the main house drain be less than four (4) inches in diameter.

TESTING FITTINGS

Rule 20. There shall be a fitting on the main house drain, just inside of the foundation of each building for testing purposes, except when the main trap is located inside of the cellar; then the testing fitting shall be next to the main trap on the house side. After the test has been applied as required by Rule 56, and has been approved by a house drainage inspector, the opening in the testing fittings shall be hermetically sealed by inserting a solid plug with a caulked lead joint.

CLEANOUTS NOT TO BE PLACED ON THE SEWER SIDE OF MAIN TRAP

Rule 21. In no case shall a cleanout be located on the main drain pipe between the main trap and the sewer or on the sewer side of main trap.

CLEANOUTS ON TRAPS

Rule 22. All traps shall be provided with cleanouts or hand holes on the side of trap nearest the fixture, and shall be protected by the water seal of trap.

COVERS FOR CLEANOUTS

Rule 23. The covers of all cleanouts or hand holes, inside of buildings, shall be properly fitted and made air-tight by the use of a brass screw cap or plug, which shall be not less than one-eighth (⅛) inch

thick; where they screw into iron pipe they shall have a solid square nut three-quarters (¾) inch high or counter sunk, with a diameter of not less than one and one-half (1½) inches. When the body of the cleanout ferrule is of cast iron it shall be equal in thickness to the cast-iron pipe to which it is to be connected. When of wrought iron it shall be equal in thickness to "Standard" wrought iron pipe. When the screw cap and ferrule are both of brass, they shall be one-eighth (⅛) inch thick and the nut may be three-eighths (⅜) inch high. The clean-out of a bath trap shall be covered with a brass screw cap, which shall be exposed on the floor close to the bath tub, and shall be on the side of the trap seal nearest the bath tub, and be protected by the water seal of the trap. Additional cleanouts shall be located at points on the drain pipes when it shall be deemed necessary by the Bureau of Health.

LOCATION OF MAIN TRAP

Rule 24. If the main trap is located in the cellar or inside of a building the iron main drain pipe shall extend to at least ten (10) feet beyond the foundation wall.

RELIEVING ARCH

Rule 25. Where drains pass through a new foundation wall, a relieving arch shall be built over it with a two (2) inch clearance on either side.

VERTICAL SOIL, WASTE AND VENT PIPES

Rule 26. In all buildings having house drainage systems, there shall be a main vertical soil or ventilating pipe, not less than four (4) inches in diameter; except in old buildings where the fixtures consist of a sink and bath tub only, then the waste or ventilating pipes may be not less than two (2) inches in diameter, provided that such building is not more than four (4) stories in height.

LOCATION OF SOIL, VENT AND WASTE PIPES

Rule 27. All soil, waste and vent pipes shall be located inside of new buildings, and also old buildings except in old buildings where it is deemed inadvisable; then the pipes may be placed on the outside of the building on the owner assuming all responsibility for the same in writing.

SIZE OF SOIL PIPE

Rule 28. The size of soil pipes must be not less than those set forth in the following tables.

Horizontal lines are to be increased as fixtures are added, but verticals throughout their entire length are to have diameter given for the total number of fixtures which discharge into them (the foregoing shall also apply to Rule 29):

Vertical lines	Number of water closets
4 inches	1 to 12
5 inches	13 to 25
6 inches	26 to 40

If the building is five (5) and less than twelve (12) stories in height, the diameter shall be not less than five (5) inches; if twelve (12) stories or more, it shall be six (6) inches in diameter.

Horizontal lines	Number of water closets
4 inches	1 to 6
5 inches	7 to 12
6 inches	13 to 20

Small fixtures, in number not to exceed twice the number of water closets, may discharge into the lines above specified without increasing their size.

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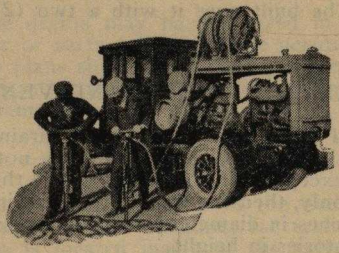

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SIZE OF HORIZONTAL AND VERTICAL LINES OF WASTE PIPE (See Rule 28)

Rule 29.

Horizontal and vertical lines	Number of small fixtures
1¼ inches	1
1½ inches	2
2 inches	3 to 5
2½ inches	6 to 9
3 inches	10 to 16
4 inches	17 to 25
5 inches	26 to 40
6 inches	41 to 70

If the building is five (5) to ten (10) stories in height, the vertical waste pipe shall be not less than three (3) inches in diameter; if eleven (11) to sixteen (16) stories, four (4) inches; seventeen (17) to twenty-one (21) stories, five (5) inches; over twenty-one (21) stories, six (6) inches in diameter.

BRANCH WASTE PIPES

Rule 30. Waste pipes from wash basins, sinks, bath tubs and urinals shall be not less than one and one-quarter (1¼) inches in diameter, and wash tray waste pipes not less than one and one-half (1½) inches in diameter; where they set in a range of three (3) or more, the waste pipe shall be not less than two (2) inches in diameter.

MATERIAL OF MAIN DRAIN, SOIL, WASTE AND VENT PIPES

Rule 31. All main drain, soil, waste and ventilating pipes shall be of plain cast iron, galvanized lap-welded wrought iron, galvanized steel or brass pipe.

LEAD WASTE PIPES

Rule 32. Lead waste pipes may be used for short branches on horizontal lines, and for vent connections, that are two (2) inches or less in diameter, and shall have not less than the following weight:

Diameter	Weight per foot
1 inch	2 lbs. 0 ozs.
1¼ inches	2 lbs. 8 ozs.
1½ inches	3 lbs. 8 ozs.
2 inches	4 lbs. 0 ozs.

WASTE PIPES TO BE CONNECTED DIRECTLY

Rule 33. All waste pipes except refrigerator waste pipes and those specified in Rule 36 shall be directly connected with the drainage system.

WHERE NO SEWER IS ACCESSIBLE

Rule 34. Where there is no sewer accessible, the drainage of all fixtures (except water closets), together with surface inlets and rain water conductors, shall be drained separately to the curb line where practicable by drain pipes not less than four (4) inches in diameter and discharge into the public gutter, unless otherwise permitted by the Board of Health.

WASTE PIPES FROM REFRIGERATORS

Rule 35. No waste pipe from a refrigerator or other receptacle in which provisions are kept or stored shall be directly connected to any drain or soil pipe or to a rain conductor.

Such waste pipes shall discharge into an open water supplied fixture properly trapped or over other properly arranged catchments for drainage.

Refrigerator waste pipes shall be as short as possible. They shall be trapped and so arranged as to permit of frequent flushings.

Small refrigerators may have movable water-tight catch basins placed directly under the refrigerators.

WASTE PIPES FROM FILTERS AND GAS ENGINES, ETC.

Rule 36. The discharge of waste pipes from water filters, gas engines, soda water fountains, air compressors or vacuum cleaners shall not be connected directly with any drain, soil or other waste pipes. They shall be discharged into an open fixture properly trapped.

SAFE WASTE PIPES

Rule 37. All drip or waste pipes from safe linings under fixtures shall be by special pipe run to an open sink outside of the house or to some conspicuous point, and be provided with a flap valve on the end of the pipe.

In no case shall any such pipe be connected with a drain, soil or waste pipe.

OVERFLOWS FROM TANKS

Rule 38. The overflow pipe from a house supply tank shall be discharged on the roof where possible, and in such cases shall be brought down to within six (6) inches of the roof, or it must discharge over a properly trapped water supplied fixture having a waste pipe equal at least to the overflow pipe. Emptying pipes from tanks shall be discharged in the same manner as required for overflow pipes, or they may be connected with the overflow pipe.

The overflow from water closet tanks may discharge into the bowl of the closet.

In no case shall an overflow pipe be connected with any drain, soil or water pipe.

ANTI-SYPHON PIPES

Rule 39. All anti-syphon vent pipe lines and main branches shall be plain cast iron, galvanized wrought iron, galvanized steel or brass pipe.

All traps shall be protected from syphonage, where anti-syphon pipes are used; the main and branch vent pipes shall be increased in size as fixtures are added, as follows:

Diameters	Maximum length	No. and size of traps
1½ inches.....	25 feet.....	1 to 2 traps, 1¼ in. or 4 in.
2 inches.....	50 feet.....	1 to 5 traps, 3 in. or 4 in.
2½ inches.....	75 feet.....	6 to 9 traps, 3 in. or 4 in.
3 inches.....	100 feet.....	10 to 15 traps, 3 in. or 4 in.
4 inches.....	150 feet.....	16 to 25 traps, 3 in. or 4 in.
5 inches.....	200 feet.....	26 to 40 traps, 3 in. or 4 in.
6 inches.....	250 feet.....	41 to 60 traps, 3 in. or 4 in.

Four traps of one and one-half (1½) inches in diameter shall be considered equal to one four (4) inch trap.

VENT AND ANTI-SYPHON PIPES FOR TRAPS

Rule 40. Vent or anti-syphon pipes shall be connected to the side of the waste pipe as near the trap as practicable, water closets and slop sinks having earthenware traps shall have the connection of vent with the branch soil or waste pipe. Branch vent pipes must be so constructed as to prevent obstruction.

CONNECTION OF VENT PIPES

Rule 41. Vent or anti-syphon pipes shall be extended through the roof or may be connected to the adjoining soil or waste pipes, above the highest fixture, providing said soil or waste pipe is not more than six (6) feet distant, or there are not fixtures on more than six (6) floors.

Where the vent is connected to the soil or waste pipe the said soil pipe shall be increased one (1) inch in diameter from the junction, except where the soil pipe is four (4) inches or more in diameter and the vent pipe is two (2) inches or less in diameter.

OFFSETS ON VENT LINES

Rule 42. All offsets must be made at an angle of not less than forty-five (45) degrees to the horizontal, and all lines must be connected at the bottom with a soil or waste pipe, or the drain, in such a manner as to prevent the accumulation of rust scale. Branch vents must be kept above the top of all connecting fixtures, to prevent the use of the vent pipes as soil or waste pipes.

VENTILATION OF BRANCH OR HORIZONTAL PIPES

Rule 43. Every branch or horizontal soil or waste pipe to which a group of two or more fixtures are to be connected, and every branch line of horizontal soil pipe eight (8) feet or more in length to which a water closet is to be connected, or a waste pipe twelve (12) feet or more in length to which is to be connected a fixture, shall be ventilated either by extending said soil or waste pipe to at least two (2) feet above the

highest part of the roof or by extending said soil to waste and connecting it with the main soil pipe above the highest fixture or by ventilating or anti-syphon pipe, as provided for in Rules Nos. 39, 40 and 41.

FLUES FOR VENTS

Rule 44. No brick, sheet metal or earthenware flue or chimney flue shall be used as a sewer ventilator or to ventilate any trap, drain, soil or waste pipe.

ALL NEW BUILDINGS TO HAVE VENT PIPE

Rule 45. The drainage system of all new buildings, whether connected with a sewer, well or discharged on the surface, shall be provided with a ventilating or soil pipe, extending to at least two (2) feet above the highest part of the roof of the building, not less than four (4) inches in diameter.

MATERIALS AND WORKMANSHIP

Rule 46. All materials shall be of good quality, free from defects, and all work must be executed in a thorough and workmanlike manner.

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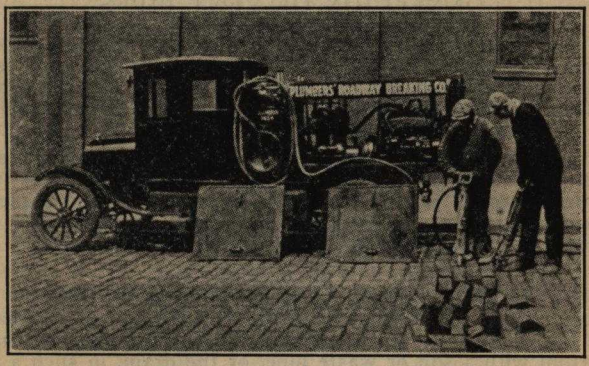

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CAST IRON PIPES

Rule 47. All cast-iron pipes and fittings must be uncoated, sound, cylindrical and smooth, free from cracks, sand holes and other defects, of a uniform thickness and of full interior diameter as specified, and shall conform to the following relative weights:

Standard	Extra Heavy
2-inch pipe, 4 lbs. per ft.	2-inch pipe, 5½ lbs. per ft.
3-inch pipe, 6 lbs. per ft.	3-inch pipe, 9½ lbs. per ft.
4-inch pipe, 9 lbs. per ft.	4-inch pipe, 13 lbs. per ft.
5-inch pipe, 12 lbs. per ft.	5-inch pipe, 17 lbs. per ft.
6-inch pipe, 15 lbs. per ft.	6-inch pipe, 20 lbs. per ft.
7-inch pipe, 20 lbs. per ft.	8-inch pipe, 37 lbs. per ft.
8-inch pipe, 25 lbs. per ft.	7-inch pipe, 27 lbs. per ft.

All cast-iron pipes and fittings shall have the name of the manufacturer, size and weight per foot cast on the exterior surface directly back of the hub of each length or section of pipe in characters not less than one-half (½) inch in length.

WROUGHT IRON AND STEEL PIPES AND FITTINGS

Rule 48. All wrought iron and steel pipes must be lap-welded, properly tested by the manufacturer, and be equal in quality to "Standard."

No uncoated or plain black wrought iron or steel pipe will be permitted.

Wrought iron and steel pipe must be galvanized, and each length must have the weight and maker's name stamped on it. Fittings for vent pipes of wrought iron or steel may be the ordinary cast or malleable steam or water fittings.

Fittings for waste or soil pipes shall be special heavy cast iron recessed and threaded drainage fittings, with smooth interior water way, and threads tapped so as to give a uniform grade to branches at least one-fourth (¼) inch per foot. All fittings for wrought iron or steel pipe must be galvanized.

All joints to be screw joints made up with red lead or other substance approved by the Board of Health, and the burr formed in cutting must be carefully reamed out.

WEIGHT AND THICKNESS OF WROUGHT IRON AND STEEL PIPE

Rule 49. Wrought iron and steel pipe shall be of full interior diameter, not less than the average thickness and weight set forth in the following table.

Diameter	Thickness	Weight per linear foot
1½ inches	.145 inch	2.68 pounds
2 inches	.154 inch	3.61 pounds
2½ inches	.204 inch	5.74 pounds
3 inches	.217 inch	7.54 pounds
3½ inches	.226 inch	9.00 pounds
4 inches	.237 inch	10.60 pounds
4½ inches	.246 inch	12.49 pounds
5 inches	.259 inch	14.50 pounds
6 inches	.280 inch	18.76 pounds

Diameter	Thickness	Weight per linear foot
7 inches	.301 inch	23.27 pounds
8 inches	.322 inch	28.18 pounds
9 inches	.344 inch	33.70 pounds
10 inches	.366 inch	40.00 pounds
11 inches	.375 inch	45.00 pounds
12 inches	.375 inch	49.00 pounds

BRASS PIPE

Rule 50. All brass pipes used for soil, waste, vent pipes and solder nipples must be thoroughly annealed seamless drawn brass tubing of "Standard" iron pipe gauge with the exception of such brass pipes as may be used for overflows and waste pipes from bath tubs, between the trap and the tub, waste pipes from wash tubs, standing waste pipes and traps of lavatories and sinks, from the floor or walls to the fixture, which may be of a gauge less in thickness than iron pipe gauge, but in no case shall the walls of the pipe be less in thickness than No. 17 of Brown & Sharp gauge. When brass pipes and traps are used, the walls of which are less in thickness than iron pipe gauge, they shall have the number of the gauge stamped into the metal for inspection.

In absence of the number of the gauge being stamped on said pipes and traps, it shall be deemed sufficient cause for its condemnation and the requiring of its removal from the work.

Threaded connections on brass pipe must be of the same size as iron pipe threads for same size of pipe, and be tapered. Connections on brass pipe and between brass pipe and traps on iron pipe must not be made with slip joints or couplings. Nor shall any slip joint or coupling be used for a connection on the sewer side of any trap. The following average thickness and weights per linear foot of full interior diameter will be required for brass pipe:

Diameter	Thickness	Weight per linear foot
1½ inches	.145 inch	2.84 pounds
2 inches	.154 inch	3.82 pounds
2½ inches	.204 inch	6.08 pounds
3 inches	.217 inch	7.93 pounds
3½ inches	.226 inch	9.54 pounds
4 inches	.237 inch	11.29 pounds
4½ inches	.246 inch	13.08 pounds
5 inches	.259 inch	15.37 pounds
6 inches	.280 inch	19.88 pounds

AIR INLETS

Rule 51. There shall be an air inlet for fresh air entering the drain just inside the water seal of the main trap.

AIR INLETS ARE NOT TO BE USED

Rule 52. No air inlet shall be used at the rear end of a system of drainage. In lieu thereof a ventilating pipe not less than two (2) inches in diameter shall be connected at the rear end of the drainage system and extended to a point at least (2) feet above the roof.

When a water closet is connected with a drain pipe, and located in the cellar or basement in rear of a soil or vent pipe which extends to the roof, there shall be a separate vent pipe not less than two (2) inches

in diameter, which shall extend to the roof as required for soil and ventilating pipes.

Small fixture waste pipes, exclusive of water closets or slop sinks, not to exceed four (4) may be connected to the said two (2) inch line of pipe, providing the building is not more than four (4) stories in height.

If a water closet is to be connected, then the pipe shall be not less than four (4) inches in diameter.

In buildings five (5) or more stories in height, the size of the soil, waste and vent pipes shall be as provided in Rules 28 and 29.

LOCATION OF AIR INLETS

Rule 53. Air inlets shall lead to the outer air and open at a convenient point. If located on the footway in the front of a building, they shall be located at the curb line, and shall have a cover with openings at least three-fourths (¾) of the area of the pipe.

They shall be so arranged as to prevent the admission of sticks or other articles that would tend to obstruct the main trap.

They shall be at least one-quarter (¼) of an inch in thickness, fastened with brass screws or bolts, in order that the top may be removed if necessary, and the body shall be caulked fast to the upright pipe by a lead joint.

If they are located on lawns or grass plots they shall extend not less than six (6) inches nor more than fifteen (15) inches above the surface of the ground, and shall be protected by a return bend or cowl securely fastened with brass screws or bolts.

No form of air inlet shall be used unless it has been approved by the Bureau of Health.

SIZE OF AIR INLETS

Rule 54. Air inlets shall be of the same size as the drain up to four (4) inches for five (5) and six (6) inch drains; they must not be less than four (4) inches in diameter. For eight (8) inch drains, not less than six (6) inches or its equivalent, and for larger drains not less than eight (8) inches in diameter or its equivalent, unless otherwise permitted by the Board of Health.

AIR INLETS NOT TO OPEN

Rule 55. In no case shall an air inlet open within ten (10) feet of any cold air intake for a heater, window, shaft ventilating basement or cellar, nor in front of doorsteps.

TEST

Rule 56. There shall be a test of atmospheric pressure of not less than three (3) pounds to the square inch applied to the drainage system, including all soil, drain, vent, anti-syphon pipes and rain water conductors inside of new buildings, and of the new work in alterations or additions to drainage systems in old buildings, when alterations or additions are made to said systems, if, in the judgment of the health authorities it is deemed necessary for the protection of health, and all defects discovered by this test shall be repaired at the owner's expense, when so directed by the said health authorities. Said test shall extend to all drain pipes to a point at least five (5) feet beyond foundation walls, excepting the pipe extending through the front foundation towards the sewer if the main trap is at the curb line and the cleanout or testing fitting is close to the inside of the said front foundation wall.

WATER TEST

Rule 57. Where it is considered impracticable to apply the air test, a water test may be applied to the horizontal lines of drains by special permission of the Board of Health, providing the pipe so tested is exposed to view in all its parts, until after the test has been approved by the inspector.

The test shall be under a head of water at least six (6) feet above all parts of the work to be tested, including all joints and connections.

PLUGS FOR TESTING

Rule 58. Opening in drain pipes shall be stopped for testing by a proper expansion plug, screw, cap or plug. The use of plaster of paris or any similar substance for this purpose is prohibited.

The material and labor for testing shall be furnished by the master plumber, and the test applied by him or his representative in the presence of a house drainage inspector.

FIXTURES NOT TO BE CONNECTED BEFORE TEST

Rule 59. No fixture shall be connected with a drainage system or any part thereof, which requires testing under these rules until the test has been applied and approved by the inspector of house drainage.

DEFECTS

Rule 60. Defective materials and drainage work poorly constructed and unworkmanlike in manner, or which does not conform to these rules and regulations, shall be removed by the master plumber when condemned by the inspector of house drainage.

No cement, wax, grease, paraffine, plaster, salammoniac, sand or other improper substance shall be used about any of the drainage system, and the presence of any foreign substance about a joint or any part of a drainage system shall be sufficient cause for condemning such joint or part of said system. Any split fittings, hubs, defective material not as specified in these rules and regulations which shall have been condemned by the inspector shall be removed from the work and not used again.

PIPES NOT EASILY ACCESSIBLE

Rule 61. The drain, soil and waste pipes and traps shall, if practicable, be exposed to view for the ready inspection at all times, and for convenience in repairing; when they are not easily accessible extra heavy pipes shall be used at the discretion of the Bureau of Health.

INSPECTION

Rule 62. No drainage work shall be covered or concealed in any way until after it has been examined and approved by a house drainage inspector.

Notice must be sent to the Bureau of Health in writing when the work is sufficiently advanced for inspection, giving location of property, plan number and character of work to be inspected, over the signature of the master plumber.

Immediately on the completion of the work, application for final inspection must be made.

When work is ready for inspection, the plumbing contractor shall make such arrangements as will enable the proper officer to reach all parts of the building easily and readily, and also have present the proper apparatus and appliances for making tests and furnish such assistance as may be necessary to a proper application of same.

WIPED SOLDER JOINTS

Rule 63. All connections between lead pipes and lead or brass pipes, or between bends or traps and ferrules shall be round, wiped solder joints. In no case will bit or cup joints be permitted.

JOINTS ON CAST, WROUGHT IRON, STEEL OR BRASS PIPES

Rule 64. All joints on cast-iron pipe shall be made with picked oakum and molten lead, thoroughly caulked and made gas tight, twelve (12) ounces of soft pig lead shall be used for each joint for each inch in the diameter of the pipe.

All joints in wrought iron, steel or brass pipes shall be screwed joints, made up with a paste of red lead or other substances as may be approved by the Board of Health, and made gas tight.

CONNECTIONS WITH EARTHENWARE TRAPS AND LEAD BENDS

Rule 65. Connections with earthenware traps and lead bends shall be by a heavy cast-brass floor plate one-fourth (¼) inch in thickness fastened to the floor with screws or bolts, and soldered to the lead bend; the floor plate bolted to the flange of the traps and the joint made gas tight by a pure rubber gasket of not less than one-fourth (¼) inch thickness with one-eighth (⅛) inch corrugation, three-fourths (¾) inch in width, or by a paste of proper consistency of red or white lead.

LEAD BENDS AND TRAPS

Rule 66. Lead bends and traps for water closets and slop hoppers shall be not less than one-eighth (⅛) inch in thickness; all other lead traps shall conform in thickness to the lead waste pipe to which they are to be attached.

The name of the manufacturer and the weight per foot shall be on each lead bend and trap.

BRASS FERRULES AND SOLDER NIPPLES

Rule 67. Cast brass ferrules and solder nipples shall be one-eighth (⅛) inch in thickness and of full diameter, as specified. Brass pipe used for solder nipples shall be iron pipe gauge as specified in Rule No. 50.

TRAPS

Rule 68. No form of trap shall be used unless it has been approved by the Board of Health.

Every fixture shall be separately and effectually trapped by a water sealing trap placed as near the fixture outlet as possible.

A set of washtubs or trays only may be connected with one trap.

The discharge from a fixture must not pass through more than one trap before reaching the house drain.

Traps shall not be more than one size larger than the waste pipe to which they are attached. All traps must be well supported and set true with respect to their water levels. Vent horns on earthenware traps are prohibited. Traps that depend on interior partitions for a seal, except earthenware ones, are prohibited.

All exposed or accessible traps, except water closet traps, must have brass trap screws for cleaning.

All iron traps for house drain, yard and other drains, and rain water conductors, must have hand holes, cleanouts of full size of the traps when same is less than five (5) inches.

Traps for rain water conductors shall have a water seal of not less than five (5) inches.

Iron traps for rain water conductors, areas, floor and other drains shall be not less than three (3) inches in diameter.

Traps for bath tubs must have cleanouts exposed on the floor of bath rooms. The body of such traps shall be not less than two and one-half (2½) inches in diameter, and the cleanout must be protected by a water seal of not less than one and one-half (1½) inches in depth.

No sink, dish washer or other receptacle for greasy water in a kitchen or other room for general cooking shall be connected with the drainage system unless it shall be tapped with an approved grease trap. This rule shall not be construed to apply to private dwellings.

STRAINERS

Rule 69. All fixtures other than water closets and urinals must have strong metallic strainers, or bars over the outside to prevent obstruction of the waste pipe.

Strainers for cesspools shall have openings equal in area to not less than three-fourths (¾) the area of the drain pipe to which cesspool connects.

WATER CLOSETS

Rule 70. For all sewer connected buildings occupied or to be occupied there must be at least one water closet, and there must be an additional water closet for every fifteen (15) occupants or fractional part thereof.

WATER CLOSETS IN LODGING HOUSES

Rule 71. In lodging houses there shall be one water closet for every fifteen (15) single beds or accommodations for every fifteen (15) lodgers or fractional part thereof, together with sufficient urinal accommodations.

WATER CLOSETS NOT TO BE SUPPLIED FROM SUPPLY PIPES

Rule 72. No water closet of any description shall be supplied with water or flushed directly from the water supply pipes.

WATER CLOSETS SUPPLIED WITH WATER FROM TANKS

Rule 73. All water closets of every description shall be supplied with water from special tanks or cisterns, which shall hold not less than eight (8) gallons of water when up to the level of the overflow pipe for each closet supplied, except automatic or syphon tanks, which shall hold not less than five (5) gallons of water for each closet supplied. The water in said tanks shall not be used for any other purpose.

FLUSHING RIM BOWLS, NO ENCLOSURES, ETC.

Rule 74. All water closets must have flushing rim bowls, and outlet horns projecting at least three-quarters (¾) of an inch below the base, or below the floor line of the water closet, except where lead bends are used, then a heavy brass floor plate shall be soldered to the bend, fastened to the floor and also securely fastened to the base of the water closet by an approved cement, or where a metal connection is used: Provided, that hereafter no water closet shall be installed in any building or in any premises in the City of Philadelphia, until it has first been approved by the Department of Health.

All plumbing fixtures must be set open and free from all enclosing woodwork. Where water closets will not support a rim seat, the seat must be supported on legs of galvanized iron, or non-corrosive material, and a drip tray enameled on both sides, secured in place, shall be used.

LOW DOWN WATER CLOSETS

Rule 75. Low down tank water closets shall be of syphon pattern.

TYPES OF WATER CLOSETS PROHIBITED

Rule 76. Pan, valve, plunger, offset washout, water closets which do not have horns projecting at least three-quarters (¾) of an inch below the base or below the floor line, except as noted in Rule 74, and other water closets having an unventilated space, or whose walls are not thoroughly washed at each discharge, are prohibited.

LATRINES, ETC.

Rule 77. Latrines, range, trough, long hopper water closets and similar appliances will not be permitted inside of a building. Where they are used in a special building, outside of the building proper, they shall be iron enamelled inside and outside, and supplied and flushed with water from special reservoirs, and not located within twenty (20) feet of a building when practicable.

FLOORS IMPERVIOUS TO MOISTURE

Rule 78. In tenement houses, where two or more closets are in a group, lodging houses, factories, workshops, saloons, public buildings,

and in all places where water closets and urinals are for public use, the floor of the entire toilet room in which water closets and urinals are located and sidewalls to a height of at least sixteen (16) inches from the floor, except at the door, must be made waterproof with asphalt, cement, tile, slate or other material impervious to moisture, approved by the Board of Health.

LOCATION OF WATER CLOSETS

Rule 79. Water closets or urinals shall not be located in any room or apartment of any building until the proposed location shall have first been approved by the Bureau of Health.

Water closet and urinal apartments or rooms, must have direct communication with the outer air, either by a window or air shaft, having an area of at least four (4) square feet; except where forced ventilation by an exhaust fan is used, then the air shaft may be of such area as may be approved by the Bureau of Health.

Water closets or urinals shall not be located in, or entered directly from a kitchen or room in which food is kept, or prepared for public consumption or sale.

Water closets shall not be located in sleeping rooms.

The general water closet accommodations for a tenement, rooming or lodging house, shall not be located in the cellar, basement or under sidewalks.

YARD WATER CLOSETS

Rule 80. When water closets are placed in the yard they shall be of the hopper pattern, so arranged as to be adequately flushed with water from a reservoir. Yard water closets may be with or without pits. If pit water closets are used, their water supply shall be protected from freezing by placing them in a pit three and one-half (3½) feet below the surface of the ground. The walls of the pit shall be of brick or stone, not less than nine (9) inches thick, laid in cement mortar, or they may be of the same thickness of concrete. Hopper pits shall not be located within eight (8) feet of any foundation wall when practicable. The waste from the stop cock or valve shall be conveyed to the drain pipe through a three-eighths (⅜) inch lead pipe properly connected.

ENCLOSURE OF YARD WATER CLOSETS

Rule 81. The enclosure of yard water closets shall be ventilated by slatted openings, or movable sash windows. When pit closets are used, there shall be a trap door in the floor of sufficient size for access to the pit. Hopper water closets of the pitless type shall have floors at least four (4) inches thick, three (3) inches of which shall be of concrete, with one (1) inch top layer of cement mortar finished to a smooth surface. Floors of yard water closets must be at least three (3) inches above the grade of the yard. Pitless hopper water closets may be located in or against a frame shed, and the closet enclosure entered therefrom, provided such enclosure has a window or skylight, having an area to the open air of at least four (4) square feet. In no case shall the enclosure of a yard water closet have a direct opening to a kitchen. Traps of pitless water closets shall be not more than eighteen (18) inches below the surface of the floor of the closet.

VENTILATION OF INTERIOR WATER CLOSET APARTMENTS

Rule 82. In all buildings where water closet apartments are partitioned off from a room used for other purposes, the outside partitions of such apartments shall extend to the ceilings or be ceiled over, and these partitions must be to all intents and purposes airtight.

The outside partition must include a window, opening to the outer air on the lot whereon the building is situated or on the street, or it shall be ventilated by an air shaft opening to the outer air, having an area of at least four (4) square feet. Where there is more than one water closet apartment having an opening into an air shaft, the said shaft shall have an area equal to four (4) square feet of area for each water closet apartment, unless otherwise permitted by the Bureau of Health.

Interior partitions of a water closet apartment shall be dwarf partitions.

Where it is necessary to properly light such apartments, the upper part of the outside partition shall be made of glass. This rule shall also apply to the apartment for urinals.

When a water closet is located in a cellar or basement of a dwelling the heating apparatus for the house must draw its fresh air supply (if any) from the outside air, through a duct or ducts, suitable for the purpose, and must not draw its air from the cellar. There must be a water closet enclosure with tight partitions extending up to the ceiling. The compartment must include a window having an opening to the outer air of not less than four (4) square feet.

Where water closets are located in cellars or basements of buildings, not used as dwellings, there must be provided a window having an opening to the outer air of not less than six (6) square feet where practicable, and the floors must be of material impervious to moisture with a base of the same material sixteen (16) inches in height around all the walls. The water closet fixtures must be of a modern type, high grade, syphon flushing bowl pattern, supplied with water from a special tank.

WATER SUPPLY FOR FIXTURES

Rule 83. All water closets and other plumbing fixtures must be provided with a sufficient supply of water for flushing to keep them in a proper and cleanly condition.

HOUSE SUPPLY TANKS

Rule 84. House supply tanks must be covered so as to exclude dust, and must be so located as to prevent the water from being contaminated by gas and odors from plumbing fixtures. Tanks must be of wood, iron or wood lined with tinned and planished copper.

Tanks must be supported as directed and approved by the building inspectors.

WATER CLOSET SUPPLY TANKS

Rule 85. A group of water closets and urinals may be supplied from one tank, but water closets and urinals on different floors shall not be flushed from one tank, except where a separate valve device is used on the flushing pipe of each water closet; said device shall insure a sufficient water supply and not be subject to syphonic action.

But in no case shall such valve device be used on water supply pipes connected directly with the street main.

The flushing pipe of each and every water closet when fitted with a valve device shall be provided with a separate stop cock or valve of proper size.

Tanks or cisterns shall be of such capacity as to insure at all times a sufficient water supply for water closets and urinals, and the water from said tanks or cisterns shall not be used for any other purpose.

TANKS PROHIBITED

Rule 86. Plain and painted iron tanks or cisterns for water closets and urinals are prohibited.

Copper lining for water closet and urinal tanks or cisterns shall not be less than twelve (12) ounce copper, and the weight must be stamped on the metal at the top of the tank.

FLUSHING PIPES

Rule 87. The flushing pipes for water closets shall be not less than one and one-quarter (1¼) inches in diameter, and the flush couplings must be the full size of the flush pipe.

REPLACING WATER CLOSETS

Rule 88. Whenever a water closet of the prohibited type is replaced, the reconstruction of adjacent small fixture wastes and vents required to bring them into conformity with these rules and regulations shall be performed, and the soil stack also extended at least two (2) feet above the highest part of the building.

If a water closet is placed on a soil pipe, which has been or is also used as a rain water conductor, or any additional connection is made to such a soil pipe, then the rain water shall be diverted from such soil pipe and carried to the house drain by a proper independent pipe, and trapped as provided for rain water conductors, and the soil pipe extended above the roof as required for soil pipes.

URINALS

Rule 89. All urinals must be constructed of materials impervious to moisture that will not corrode under the action of urine. The floors and walls of urinal apartments must be lined with similar non-corrosive and non-absorbent material.

Iron trough urinals must be enameled iron, inside and outside; no plain or painted iron urinals will be permitted.

Urinals inside of a building must be flushed by a special tank or cistern, the flush pipe of which is not less than one (1) inch in diameter.

RAIN WATER CONDUCTORS

Rule 90. All buildings shall be kept provided with proper metallic leaders for conducting water from the roofs in such manner as shall protect the walls and foundations of said building from injury. In no case shall the water from said leaders be allowed to flow upon the sidewalk, but the same shall be conducted by a pipe or pipes to the sewer. If there is no sewer in the street upon which said buildings front, then the water from said leaders shall be conducted by proper pipe or pipes below the surface of the sidewalk to the street gutter.

Inside leaders must be constructed of cast iron, wrought iron or steel, with roof connections made gas and water-tight by means of a heavy lead or copper-drawn tubing, wiped or soldered to a brass ferrule, or nipple caulked, or screwed into the pipe. The tubing must extend at least seven (7) inches into iron leader pipe. Outside leaders may be sheet metal, but they must connect with the house drain by means of a cast iron pipe extending vertically five (5) feet above the grade level.

Rain water conductors may be connected with the upright soil pipe of a hydrant cesspool, providing said cesspool does not receive the discharge from waste pipes.

Rain water leaders must be trapped with cast iron traps, so placed as to prevent freezing, and have a seal of at least five (5) inches; except those placed inside of a building that are gas tight, and do not open near a window or air shaft, ventilating rooms. In such cases the trap may be omitted by special permission of the Board of Health.

Rain water leaders must not be used as soil waste or vent pipe, nor shall such pipes be used as a leader.

STEAM EXHAUST AND BLOW-OFF

Rule 91. No steam exhaust boiler blow-off, drip pipe, hot water or other hot liquid shall discharge into a house drain inside of the main trap or a soil pipe; such discharge must first be to a condensing or cooling tank of proper dimensions and construction, and provided with a vapor pipe not less than four (4) inches in diameter of wrought iron, with screw joints. The discharge pipe from the condensing tank shall connect with the house drain on the sewer side of the main trap, and be provided with such traps as may be necessary to prevent the ingress of sewer gas or air.

This rule shall not be construed to apply to ordinary boilers connected with a range of a dwelling, except that no sediment cock shall directly connect with the drain or waste pipe.

DRAINAGE OF FIXTURES BELOW SEWER LEVEL

Rule 92. All fixtures in a basement below the level of the sewer shall discharge into a sump or receiving tank, made air-tight, and ventilated by extending a vent pipe not less than four (4) inches in diameter to a point at least two (2) feet above the highest part of the building. And the contents of said sump or tank lifted and discharged into the drainage system of some approved method, or an improved ejector may be used to lift the sewage to the drainage system.

FLOOR AND SUB-SOIL DRAINS

Rule 93. Floor and other drains in cellars will only be permitted when it can be shown to the Bureau of Health that it is absolutely necessary, and arrangements are made to maintain a permanent water seal, the drainage system is properly ventilated, and the branch pipe for floor drain provided with a back pressure valve. Sub-soil or drains for draining cellars shall be constructed as follows: By a system of French drains or field tile, to a catch basin, or receiving tank properly flagged or covered over, the outlet pipe shall be properly trapped, and connected with the house drain, and be provided with a back pressure valve the required size with accessible cleanout.

If the catch basin is below sewer level, the contents shall be lifted by an approved method and discharged into the house drain.

Catch basins or receiving tanks for sub-soil drainage shall have a ball cock attached to the water supply pipes, in order to maintain a water seal up to the level of the outlet pipe, which shall be trapped by turning a bend down into the water of the basin or tank. A flap valve located in the bells of pipes will not be permitted.

AREA, YARD AND HYDRANT DRAINS

Rule 94. The yard of each lot must be provided with a cesspool for surface drainage, connected with the drainage system, and no surface water is permitted to drain to a surface water course by way of an alley or the highway, except in districts where adequate sewers are not provided. Cesspools for the reception of discharge from surfaces, and hydrants, shall not be less than twelve (12) inches in diameter and shall be trapped in a manner accessible for cleaning out. Area drains when connected with the house drains shall have not less than three (3) inch connections. They shall be controlled by one trap where practicable (if possible the rain trap), and must be provided with permanent metallic strainers.

SEWAGE DISPOSAL

Rule 95. No plant or system for the disposal of sewage shall be constructed or maintained within the limits of the City of Philadelphia, either by means of broad irrigation, sub-soil irrigation, wells or otherwise except that it is shown that the proposed system can be maintained without nuisance or danger to public health, and detailed plans of said system are submitted, approved and permit issued by the Bureau of Health for its construction.

WELLS FOR SEWAGE

Rule 96. In districts where the public sewer system is unavailable and there is sufficient ground for the purpose, on the approval of the Bureau of Health, a tight well may be used to receive the discharge of house sewage, which may be overflowed to an absorption well, providing there is no danger of contaminating a water supply well or spring, and the soil is of an absorbent character, otherwise a tight well only will be permitted to receive the discharge of water closets, and the waste from all other fixtures shall discharge to a surface water course as provided in Rule 34.

CONSTRUCTION AND LOCATION OF DRAINAGE WELLS

Rule 97. A tight well for drainage shall not be less than four (4) feet in diameter by ten (10) feet deep in the clear, or its equivalent, lined with hard brick nine (9) inches thick, laid in cement mortar and made water-tight and flagged or arched over.

An absorption or loose well shall be not less than the dimensions of the tight well, lined with dry brick or stone. Both tight and loose wells shall be provided with a twenty-four (24) inch cast iron cover and frame, and said wells shall not be located within forty (40) feet of any building when practicable, or within two (2) feet of party lines.

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PRIVY VAULTS OR CESSPOOLS

Rule 98. No privy vaults or cesspools for sewage shall hereafter be constructed in any part of the city where a sewer is at all accessible, which shall be determined by the Bureau of Health; nor shall it be lawful to continue a privy vault or cesspool on any lot, piece or parcel of ground abutting on or contiguous to any public sewer within the city limits. No connection from any cesspool or privy vault shall be made with any sewer; nor shall any water closet or house drain empty into a cesspool or privy vault.

CONSTRUCTING PRIVY VAULTS OR WELLS

Rule 99. Privy vaults or wells must be constructed as follows: Each building situated on an unsewered street must have a privy vault or well, not less than four (4) feet in diameter and ten (10) feet in the clear, lined with hard brick nine (9) inches thick laid in cement mortar and made water-tight.

LOCATION OF PRIVY WELLS

Rule 100. Privy wells shall not be located within two (2) feet of party lines or within twenty (20) feet of a building when practicable, and before any privy vault or well or cesspool for drainage shall be constructed, application shall be made and permit issued for the same by the Bureau of Health.

ABANDONING OF PRIVY WELLS

Rule 101. When a privy vault or well is to be abandoned it must be cleaned by having its contents removed by a licensed excavator. If the well is less than 15 feet in depth, from the level of the surrounding grade, the entire contents must be removed.

When the depth is greater than 15 feet below the surrounding grade, then the contents must be removed to a depth of at least 15 feet.

When the cleaning of a privy vault is commenced, it must be prosecuted continually to completion.

Immediately after each cleaning application must be made in writing to the Bureau of Health for an inspection. Upon the approval of an inspector, a certificate will be issued that the well meets with all conditions of Acts of Assembly and the Rules and Regulations of the Board of Health.

In no case should a well be filled until the well is cleaned as required and a certificate of approval has been issued by the Bureau of Health. All wells should be filled with clean earth, ashes or cinders.

PIPES TO BE SUPPORTED

Rule 102. All vertical pipe lines must be supported and at their base supported by a brick pier or heavy iron hanger from the cellar ceiling beams.

SMOKE OR PEPPERMINT TEST

Rule 103. A smoke or peppermint test shall be applied to a drainage system by the plumber, in the presence of the inspector, when it is deemed necessary by the Bureau of Health. Where the peppermint test is used, two ounces of peppermint must be provided for each line up to five (5) stories and basement in height, and for each additional five (5) stories or fraction thereof, one (1) additional ounce of peppermint for each line must be provided.

FITTINGS NOT TO BE USED

Rule 104. Short quarter bends, double hubs, offsets less than an angle of forty-five (45) degrees to the horizontal are prohibited, saddle hubs will only be permitted to be used in old work by special permission of the Bureau of Health.

DRILLING AND TAPPING

Rule 105. In old work, where the conditions are such that ample threads may be obtained, drilling and tapping is permitted.

WOODEN FIXTURES PROHIBITED

Rule 106. Wooden bath tubs and wooden wash tubs are prohibited. Wooden bath tubs lined with metal, formerly in use, shall not be installed in any other building other than that in which they were located originally.

MAIN TRAP TO BE LOCATED IN OLD WORK

Rule 107. When a soil stack is added, or any alteration or addition is made to a drainage system, and there is no main trap or air inlet on said system, such appliances shall be provided.

SOIL LINES TO BE EXTENDED BEFORE TESTING

Rule 108. No test shall be made by the inspector of any drainage work until every vertical soil and ventilating pipe shall have been extended above the roof to the height required.

REPAIRING OF TERRA-COTTA PIPES, ETC.

Rule 109. No terra-cotta drain inside a building or within five (5) feet of a foundation wall, when in a leaky or defective condition, shall be repaired or replaced to a greater length than nine (9) feet; otherwise, the entire terra-cotta pipe shall be removed and replaced with cast iron pipe of the weights prescribed.

Where excavations are made which would leave terra-cotta pipe above ground or above cellar floor, said terra-cotta pipe shall be removed and pipe substituted as is required for new work.

SLOPE

Rule 110. All drain and waste pipes must be run at uniform grade. Anti-syphon and ventilating pipes, where not vertical, must have a contiguous slope to avoid collection of water by condensation or accumulation of rust scale.

SUBMERGED FIXTURES SUPPLIES

Rule 111. All fixtures and tanks which have their water supply at or near the bottom shall have check valves on the water supply close to the fixture or tank in order to prevent the water from said fixture or tank being returned through the supply pipes.

TERMS USED

Rule 112. The term "Master Plumber," as used in these rules, shall be taken to mean a person who has an established place of business and who, either as principal or as the representative of any person, firm or corporation, represents himself as competent and qualified, and undertakes to construct, alter or make additions, or who, for himself or for any person, firm or corporation, undertakes to, and does construct, alter or make any addition to a system of house drainage.

The term "Journeyman Plumber," as contained in these rules, shall be taken to mean a plumber who is engaged in and working at the business of plumbing for and under the supervision of a master plumber.

The term "bona fide" place of business, as used in these rules, shall be taken to mean a place having a workroom or shop, equipped with the tools necessary and requisite for the proper installation of plumbing and drainage work, and has displayed on its front a sign as required by these rules, either with or without a showroom.

The term "private sewer" is applied to sewers that are not owned by the City of Philadelphia.

The term "public sewer" is applied to the sewers owned by the City of Philadelphia.

The term "house drain" is applied to the horizontal drain and its branches, extending to and connecting with the private sewer, public sewer or cesspool.

The term "main drain" is applied to the main or principal line of drain pipe connected with a cesspool or sewer, and to which branch drain pipes are connected.

The term "soil pipe" is applied to any vertical pipe extending through the roof or not, which receives the discharge of one or more water closets with or without other fixtures.

The term "waste pipe" is applied to any pipe receiving the discharge from any fixture except water closets, and also to any vertical pipe extending through the roof receiving the same character of discharge.

The term "vent and anti-syphon pipes" are applied to any special pipe provided to ventilate the system of drainage and to prevent trap syphonage and back pressure.

The term "air inlet" is applied to a pipe connected with the drain pipes for the purpose of admitting fresh air from or near the surface of the ground.

DISPUTES

Rule 113. In case of any dispute or difference of opinion existing between the Bureau of Health and any person, firm or corporation, as aforesaid, regarding the construction of plumbing, house drainage or cesspools, the same small be submitted by either party to the Director of the Department of Public Health who shall pass upon same, and whose findings therein, after hearing, shall be final and conclusive upon all parties.

PENALTY

Rule 114. Any person or persons who shall fail to comply with any of the provisions of the Act of Assembly, governing house drainage, approved June 7, 1911, regarding the procuring of a license or certificate to engage in or work at the business of plumbing or house drainage, shall be liable to a fine of not less than ten dollars, nor exceeding fifty dollars, for each and every day he or they shall engage in or work at said business without first having obtained said certificate or license; and any person or persons who shall violate any of the rules, regulations, or requirements made by the Board of Health in accordance with the provisions of the act, regarding the construction, reconstruction or testing of plumbing, house drainage or cesspools, shall be liable, for every such offense, to a fine of not less than ten dollars, nor more than fifty dollars, which fines shall be recoverable before any alderman or police magistrate in said cities by summary proceedings, and shall be sued for in the name of said cities, and, when collected shall be paid into the treasury thereof.

All fines and penalties imposed by the act are recoverable by summary proceedings, before any police magistrate or justice of the peace in said cities; and all suits or actions at law instituted for the recovery thereof are to be in the name and for the use of the city within or against which offense is committed; and, upon recovery thereof, all such fines and penalties are to be paid to the city treasury thereof. In default of the payment of any fine or penalty imposed by any police magistrate or justice of the peace, under the provisions of the act, the person or persons so offending may be committed to the jail, workhouse, or other penal institution of the county in which said city is situate for a period not exceeding thirty days.

GARAGES AND BUILDINGS FOR THE HOUSING, SALE AND REPAIR OF AUTOMOBILES

Rule 115. Every garage or other structure having a water supply either of a temporary or permanent character used for the housing, sale or repair of automobiles or in which automobiles are washed, cleaned or repaired, shall be provided with a means of drainage for the floors and repair pit in such manner as will prevent the flow of drainage therefrom over streets, alleys or paved approaches. The drainage from the floors and the repair pit shall be conducted to an intercepting pit, which shall be ventilated by extending a ventilating pipe of at least four (4) inches in diameter to at least two (2) feet above the roof, and it shall be provided with an air inlet open to the outer air. This intercepting pit shall be of a design approved by the Bureau of Health, and shall be water-tight, built of brick laid in cement, mortar or concrete, and shall be so arranged as to intercept all oils, gasoline or other fluids, as well as sand, silt or other solids for the purpose of excluding the same from the sewerage system. It shall be provided with one or more twenty-four (24) inch cast iron manholes and cover.

Shall be located so as to be easily accessible for cleaning. In garages having accommodations for one or two cars only, sand traps of a pattern approved by the Bureau of Health may be used in place of the pit.

Every garage or other structure either of a temporary or permanent character used for the housing, storing or sale of automobiles or in which automobiles are washed, cleaned or repaired, shall be equipped with adequate means for continuous ventilation.

I hereby certify that the preceding Rules and Regulations were adopted by the Board of Health of the City of Philadelphia on the 9th day of March, A. D. 1921, in pursuance of an Act of Assembly approved June 7, 1911, to take effect on the first day of April, 1921.

HARRY J. RODGERS
Chief Clerk

EXTRACTS FROM OTHER ACTS OF ASSEMBLY GOVERNING HOUSE DRAINAGE

BAKERIES, FACTORIES AND MANUFACTURING ESTABLISHMENTS

Plans for the drainage of water closets, etc., in bakeries, factories or manufacturing establishments, will not be approved by the Bureau of Health until they have first received the approval of the Department of Labor and Industry, of the State of Pennsylvania.

LODGING HOUSE

"The term lodging house is applied to every building not licensed as a hotel, inn or tavern, in which ten (10) or more persons are lodged for a price for a single night, of Twenty-five (25) cents or less for each person." (Act of July 2, A.D. 1895.)

HOUSING AND SANITATION
RAIN LEADERS

Section 20. The rain water conductor of all buildings of the grades referred to in this Act (tenement houses, dwellings, two-family houses, rooming houses) shall be connected with a sewer if there is one in the street contiguous thereto, or if there is none, as soon as such sewer is laid, but at no time shall the flow therefrom be permitted to go over the sidewalk or upon the adjoining property.

RAIN CONDUCTORS NOT TO BE USED AS WASTE PIPES

Section 21. No fixture, sink, closet or drain of any kind, receiving house sewage, shall empty into a rain conductor, nor discharge on a roof drainage to a rain conductor.

HOUSE TO BE SEWER CONNECTED

Section 22. Every dwelling or rooming house accessible to a sewer shall be connected therewith. All privy vaults or cesspools and school sinks shall be removed from the premises of any dwelling or rooming house after a sewer has been laid in a contiguous street. No building shall be used as a tenement unless it is sewer connected, and all cesspools, privy vaults and school sinks shall have been removed from the premises thereof.

WATER CLOSETS

Section 23. Every dwelling to which a public sewer and water main is accessible shall have a water closet, thoroughly flushed at all times, in a separate and independent compartment; and in dwellings having a furnace or other heating system there shall be, when feasible, at least one such water closet located within such dwelling in a separate compartment or in a bathroom.

WATER SUPPLY

Section 28. Where water mains have been placed in a street, and there is sufficient pressure, water shall be introduced in every dwelling, etc.

PLUMBING

Section 27. All plumbing, water closets and the compartments in which they are located, pipes and other like fixtures in dwellings, rooming houses and tenements, shall be installed and maintained in accordance with the plumbing regulations of cities of the first class. (Act of Assembly, June 11, 1915.).

AN ORDINANCE

To regulate and determine the fees for filing plans with the Bureau of Health, Department of Public Health and Charities, for the construction of plumbing, house drainage and cesspools.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That when a plumber shall file with the Bureau of Health, in accordance with Section 4 of the Act of Assembly, approved June 7, 1911, plans and specifications for the construction of plumbing, house drainage and cesspools, he shall pay to the Bureau of Health for each plan approved a fee in accordance with the following schedule:

1. For each plan approved on which there are not more than seven "fixtures" $1.00
2. For each additional "fixture" over seven ..... .25

The term "fixture" shall mean any receptacle attached to the house drainage system for receiving of drainage, either inside or outside of a building, or any connection provided for making a future attachment of such receptacle.

Each privy well, each drainage well and each sewage disposal plant shall be considered as a "fixture."

Wash tubs of either one or more parts shall be considered as one "fixture."

All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the twenty-eighth day of December, A.D. 1916.

THOMAS B. SMITH
Mayor of Philadelphia

THE ORDINANCE

Of September 23, 1864, provides that it shall be a nuisance:

To construct or maintain any privy well, vault or sink, for the purpose of containing any offensive matter, within two feet of the line of any adjoining lot. And in addition to the penalty hereinafter provided, five (5) dollars, the said privy well, vault or sink, shall be filled up at the expense of owner or owners thereof, by the Building Inspectors of the City of Philadelphia.

AN ORDINANCE

Of January 10, 1895

To prohibit the erection and maintenance of manure pits in certain built up portions of the city, provides:

That on and after May 1, 1895, it shall be unlawful to maintain pits used for the storage of manure (whether temporarily or otherwise) under any portion of the sidewalks in front of any building in any square, or part of a square, whether for livery or other purposes, of any street within the City of Philadelphia, which is in whole or part occupied by dwelling houses, and all pits now in existence shall either be filled up or covered in such manner that they cannot be any longer used for the purposes heretofore mentioned. Penalty, fifty dollars.

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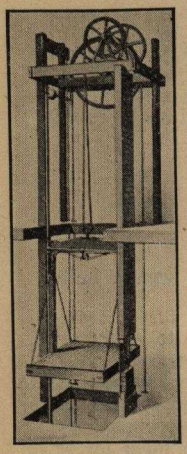

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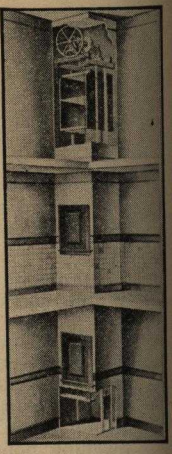

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ORDINANCES, RULES AND REGULATIONS

Enforceable by the
BUREAU OF ELEVATOR INSPECTION
(Department of Public Safety)
City of Philadelphia

AN ORDINANCE

To provide for a Bureau of Inspection of Passenger and Freight Elevators.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance it shall be the duty of the Director of the Department of Public Safety, with the approval of the Mayor, to appoint the following inspectors and other employees in the Bureau of Elevator Inspection, viz.: one Chief Inspector at a salary of three thousand five hundred (3,500) dollars per year; one Deputy Inspector, at a salary of three thousand (3,000) dollars per year; twenty-three Inspectors of Elevators, at salaries of one thousand five hundred (1,500) dollars each per year; two tank inspectors at salaries of one thousand five hundred (1,500) dollars each per year; one chief clerk, at a salary of one thousand six hundred (1,600) dollars per year; two clerks, at salaries of one thousand two hundred (1,200) dollars each per year; stenographer, at a salary of nine hundred (900) dollars per year; and one messenger, at a salary of nine hundred (900) dollars per year.

Section 2. The inspectors under this ordinance must be competent and practical elevator mechanics, having had practical experience in elevator mechanism, and all other employees appointed hereunder shall have such special qualifications as may be required for the proper inspection of passenger and freight elevators.

Section 3. Whenever the Chief of the Bureau of Inspection shall deem it necessary for the safety of the public, he shall have the power to order the discontinuance of the use of any passenger or freight elevator, and to compel the owner, lessee or agent of the building, within which such elevator is located, or any other person responsible for the running of the same, to make such alterations or repairs as he may deem necessary for the safety of persons and property using or carried upon said elevator, before the same is again put in use.

The Chief of the Bureau of Inspection shall also have the power to condemn any mechanical part or appliance connected with any passenger or freight elevator, if the same in his judgment is dangerous or unreliable, and whenever any such part or appliance has been condemned, it shall be removed and the elevator made safe, to the satisfaction of the Chief of said Bureau, before being again put in operation.

Whenever any elevator shall be in need of repairs, in any respect pertaining to the operation of the same, or any of the apparatus or machinery connected with an elevator shall become impaired, necessitating the temporary disuse of the elevator, or any accident shall occur in an elevator or elevator shaftway affecting life or limb, it shall be necessary for the owner, lessee or agent of the building in which the said elevator is located, or other person under whose control and management the said elevator is operated, to notify the Chief of the Bureau of Inspec-

tion of such impairment, disuse or accident, and shall not again put the said elevator in operation until an inspection has been made and the condition of the elevator approved by the Inspector.

Section 4. The following fees shall be charged for inspection and certificates: For elevators in buildings above eight (8) stories in height for each inspection, three (3) dollars; for each tank inspection, three (3) dollars; for each first certificate, three (3) dollars; for each annual re-issue, one (1) dollar.

For elevators in buildings eight (8) stories high or under: For each inspection, two (2) dollars; for each tank inspection, three (3) dollars; for each first certificate, two (2) dollars; for each re-issue, one (1) dollar. These fees shall be collected, as fees for inspection are now collected, in the Bureau of Boiler Inspection.

Section 5. No elevator shall be operated without having displayed therein a certificate of inspection, stating the carrying capacity of the elevator, whether freight or passenger. No person shall at any time operate an elevator unless he is over the age of sixteen (16) years, and if in the judgment of the Chief of the Bureau of Inspection, any person running an elevator shall be deemed incompetent so to do, the person, firm or corporation having control of said elevator shall at once remove such incompetent person, and replace him by a duly licensed operator. No elevator, either passenger or freight, shall be operated without an attendant, if in the judgment of the Chief of the Bureau of Inspection the character of the business, or construction or location of the elevator warrants the same. The insurance certificate clause of Section 2 of the Ordinance of May 10, 1894 is hereby repealed.

Section 6. Any person, firm or corporation operating an elevator without having a certificate as herein provided, or who shall violate any provision of this ordinance, shall be subject to a penalty of fifty (50) dollars for each and every such violation, and the said penalty shall be collected before any Magistrate or Court as debts are by law collectible.

Section 7. All elevator shafts shall conform to the requirements of Section 4, of the Act of Assembly of April 25, 1903.

Section 8. No elevator shall be erected, re-erected, or altered, and no enclosures built, or interlock or other safety appliances installed, without first having obtained a permit from the Bureau of Inspection, as provided by the Ordinance of April 6, 1900.

The applicant for a permit to erect an elevator must submit a plan of the whole ground floor of the building, showing proposed location of the shaftway, and drawings of the elevator, and also an elevation of shaftway; the said plans and drawings to be filed as a part of the records of the Bureau.

The charges for said permits shall be as follows: To erect or repair an elevator in a building under nine (9) stories in height, two (2) dollars; to erect an elevator in a building over nine (9) stories and under thirteen (13) stories in height, three (3) dollars; to erect or repair an elevator in buildings thirteen (13) stories high or over, four (4) dollars. Permit for enclosure, gate hatchway, interlocks, etc., for each elevator, two (2) dollars.

Section 9. No permit will be issued to erect an elevator or sling hoist in any thoroughfare where it is necessary to pass through the shaftway or under the elevator, whether inside or outside of the building.

No permit will be issued allowing power to be applied to any back guide elevator or roller hoist.

No wooden hoist drum will be allowed.

Section 10. Whenever any back guide elevator shall be in need of extensive repairs, it shall be condemned and replaced with a guide post car, or the hatchways must be closed; but if the shaftway occupies a thoroughfare, the location of the same must be changed, except in extreme cases, where in the judgment of the Bureau such change is practically impossible. This clause does not apply to a carriage elevator.

All elevators must be so located as to give easy and safe access to all principal parts for inspection, adjustment and repair.

Section 11. No pressure tanks shall have less strength than a factor of safety of four (4), and no other part affected by the load shall have less strength than a factor of safety of four (4) for freight, five (5) for passenger, and six (6) for all drum shafts and overhead supports.

Section 12. No power driven elevator shall have less than two (2) main hoisting cables, and all hoist cables must be attached to a substantial and effective equalizing bar with means for adjustment.

The maximum load on hoist cables must not be greater than one-sixth (1/6) of the ultimate strength for passenger elevators, and one-fifth (1/5) for freight, the basis of computation being Standard Swedes iron hoisting cable.

All sheaves and drums for hoist and counterweight cables must conform to the standards of the Bureau of Inspection.

No elevator car shall be suspended by any kind of cable other than metallic.

Every passenger elevator car hereafter constructed must have its frame built of metal, and no inferior material of any kind will be allowed to enter into the construction of any elevator.

Section 13. Every guide post elevator car must be provided with safety clutches that will prevent the car from falling in case of broken cables, or broken or deranged machinery.

Every passenger elevator now in operation, or that shall be hereafter installed, shall be provided with a speed governor in connection with a gradually applied safety.

Every freight elevator having a car speed of over fifty (50) feet per minute shall be provided with a governor working in connection with a gradually applied safety.

Every freight elevator having a car speed of less than fifty (50) feet per minute must be provided with speed governor which may work in connection with an instantaneous safety.

All elevators must be tested with a maximum load.

All wooden guide posts must be provided with independent guide strips.

Section 14. All elevators carrying more persons than the regular attendant and designated assistants, not to exceed three in number, shall be classed as passenger elevators, and are subject to all the requirements of passenger service.

Section 15. Every power-driven elevator must have automatic terminal stops other than those required on the controlling mechanism.

Every power-driven drum hoist elevator must have a slack cable controller shifter.

All brakes operated by a check line must be so arranged as to be applied automatically if the check line should break, and all electric brakes must be applied by breaking the current.

Section 16. All passenger elevators must be equipped with mechanical interlocks, and all interlocking mechanism must conform to the requirements of the Bureau.

Where any interlock already installed is found to be unreliable or does not conform to the requirements of the Bureau, it shall be condemned and be replaced within a reasonable time by an approved interlock.

REQUIREMENTS FOR ELEVATOR LOCKING DEVICE

a. The device must prevent the doors of the landings being opened either from inside or outside, except when the car is within three inches of such landing.

b. The device must prevent the opening of the landing door either from outside or inside when the car is at the landing, until after the controlling mechanism of the car has been set in position to stop the car.

c. The opening of the landing door when a car is at a floor must immediately lock the controlling mechanism in the stop position, and the device must prevent the starting of the car up or down until the landing door has been again closed and locked.

d. The locking device, electrical or mechanical, shall be such as will hold immovable and secure the carriage used in such elevator while any gate, door or doors at the landing that is used for entrance thereto or exit therefrom is or are open and unsecured.

e. The device must be so arranged that the car can run from top to bottom without touching any of the mechanism at the landing unless it is desired to stop at a floor.

f. The device, electrical or mechanical, shall be such as to place the power of controlling the elevator beyond the control of the attendant while any gate, door or doors on the landing leading to the carriage is open and unsecured.

g. The device must prevent the car leaving the landing from any cause whatever while the door of the enclosure is open.

h. No interlocking mechanism shall so affect the controller of any elevator as to reduce the valve lap to less than one-third (1/3) of its total amount.

Section 17. All automatic door opening and closing devices must be independent of the interlocking device.

Section 18. No pilot valve shall be installed or allowed to remain in service that cannot be controlled by an interlock within the limits of two-thirds (2/3) of its total lap.

Any pilot valves now in use, if in the judgment of the inspectors and the Chief of the Bureau of Inspection are considered a source of danger, shall be condemned and removed.

Every hydraulic elevator shall have an independent exhaust pipe from the controlling valve to the discharge tank, and no two cylinders will be allowed to discharge through the same pipe, unless provided with checks.

Section 19. All passenger elevators hereafter erected or re-erected must be provided with air cushions.

The shaftways of all passenger and freight elevators hereafter constructed must be enclosed below the first floor with either fire-proof or slow burning construction. All windows opening into elevator shafts are to be guarded with screens or bars.

All hand power elevators in which the platform travels more than one story shall be equipped with a speed governor.

If the shaftway of any passenger elevator is so located, or the motive power is so limited in range, as to make a basement air pit impracticable, the air pit must be constructed above the first floor.

The pit of every elevator shaftway must be kept clean and dry at all times. Stop or resting blocks will not be allowed at the bottom of shaftway, except under the strongest part of the car.

Section 20. At the top of the shaft and under the suspension sheaves and beams of every power-driven elevator there shall be built a substantial working platform or grating, the said platform or grating to be of such a character as to prevent tools or other dangerous weights from falling through and down the shaftway.

Section 21. No explosives, inflammable or suffocating material, whether solid, liquid or gaseous, or any pipe for conveying the same, shall be stored or kept under any elevator shaftway, unless the said explosives, inflammable or suffocating material shall be separated from the car by an approved air cushion.

No elevator shaftway shall be used for the storage of any material or the running of any rope, wire or pipe, except for the use of the elevator itself, and no machinery requiring the services of an attendant shall be located under any elevator shaftway unless protected by an air cushion.

Section 22. All elevators used for carrying passengers must have their hatchways surrounded by substantial vertical enclosures, the same to be made flush with the hatchway and continuous from floor to ceiling on every open side of the car and on every floor except the top, where a height of six feet six inches is sufficient. On every other side of the car the enclosures must be at least six feet six inches in height. All enclosure doors must be made to slide, except in extreme cases, where necessity compels the adoption of some other movable enclosure; but in all cases this enclosure door must be of such a character as to be controlled by an interlock. All grille work enclosures must be substantially braced and be kept in thorough repair. Wherever an elevator shaftway has been so constructed as not to admit of a mechanical interlock on the basement door, the said door must be so constructed as to close and lock automatically when the car leaves.

Whenever the car of a passenger elevator has more than one doorway every doorway must be provided with an inside sliding door, and the doors must be so arranged and connected that the opening of any one door mechanically closes all the other doors.

Every freight elevator shall have its hatchway surrounded by vertical enclosures and gates. The fixed enclosures to be not less than six (6) feet in height, and the gates to be as near six feet in height as the condition will warrant. Wooden gates must be made of vertical strips with spaces not wider than two (2) inches. All gates must be self-closing, also fitted with device to prevent them being raised until the platform is at the floor landing, and whenever practicable they must be made to slide vertically. Full automatic gates, wherever found, will be condemned, and must be replaced within a reasonable time by gates approved by the Bureau.

All enclosures must be made flush with hatchways on every open side of the car, and wherever window recesses occur in the shaftway, the same must be covered by a substantial grille or screen. Where it is necessary to place a lifting gate on an elevator car, the said gate must be so hung and balanced as to close automatically when the car leaves the landing.

Whenever, in the judgment of the Bureau, the construction of the building or the nature of the business is such that the standard vertical enclosures are impracticable, they may adopt such safeguards as will afford the best protection. Fire doors on the floor side of brick shaftways are not deemed sufficient protection, and self-closing vertical gates will be required in addition.

Every elevator occupying a thoroughfare that cannot be guarded by vertical enclosures must be provided with a loud-ringing gong that will ring continuously or at close intervals while the car is descending through the thoroughfare.

Every power-driven freight elevator must be provided with a signal bell that can be operated from every floor, and the controlling device must be provided with some sort of lock that will enable the attendant to hold the car immovable while loading and unloading. All freight elevators not in the care of a regular attendant must have signs posted on every floor prohibiting all persons from riding on the car.

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Every sidewalk elevator must be protected at the street level by a removable railing of such construction that the controlling mechanism of the said elevator will be locked and held immovable until the railing is in place.

Every sidewalk elevator must be protected by a substantial guard that will open the sidewalk doors far enough in advance of the car to prevent crushing a person between the car platform and the sidewalk doors.

Section 23. Where any freight elevator shall have flush enclosures, but not self-closing gates, the owner, agent or lessee may provide all the shaftway doors with substantial, safe inside locks and put the car in charge of a regularly authorized operator; otherwise the shaftway must be provided with approved self-closing gates.

The Bureau of Inspection shall have the power to demand a regularly licensed operator on any elevator when in the judgment of the Bureau the safety of the public requires the elevator to be placed under such control. Should the owner, agent or lessee refuse to comply with the same demand the elevator shall be locked up.

Section 24. All elevator counterweights must be hung in guides, and the foot of the guideway must be so protected as to prevent any person from being injured by the descending weights.

All counterweights must have their component parts so fastened together as to prevent any piece or pieces from becoming detached from the guides should the counterweight be accidentally drawn to the top of the shaft with the usual velocity.

Counterweights of Plunger Elevators must be connected direct to Plunger.

Section 25. All hydraulic elevators must have their valve chambers and cylinders provided with means for preventing the accumulation of air.

Section 26. If any accident shall occur to any elevator, affecting life or limb, or in any way impairing the strength or efficiency of said elevator, it shall be the duty of the engineer in charge of the building, or, in the absence of the engineer, the superintendent, to immediately, and before any broken or damaged part is removed or any steps are taken to repair the elevator, notify the Chief of the Bureau of such accident. The Chief of the Bureau shall cause any such accident to be promptly investigated, and the elevator shall not be again put in service until after investigation and satisfactory repair. The fee for the investigation of an accident shall be two (2) dollars.

The owner, agent or lessee of a building will be held responsible for the failure of the engineer or superintendent to properly report any elevator accident in said building, or for any negligence on the part of said engineer or superintendent affecting the safety of any elevator under his control.

Section 27. The builder of any elevator will be held responsible for the proper construction of the said elevator in all its parts, and for the execution of all rules and regulations of the Bureau regarding elevator construction.

Section 28. If the owner, agent or lessee of any building shall receive a written notice from the Bureau that any passenger elevator under his control is in an unsafe condition and shall continue to operate the said elevators, ignoring the requirements of the Bureau, the Chief of the Bureau shall, after the lapse of two days from date of notice, have the power to post a written notice at the elevator entrance, stating that the said elevator is in an unsafe condition, and said notice shall not be removed until so ordered by the Chief of the Bureau.

Section 29. All power-driven elevators must be inspected at least once every three months after first inspection. All hand hoist elevators must be re-inspected at least once in six months after first inspection.

Pressure tanks must be inspected as often as, in the judgment of the Bureau, their condition may require.

Certificates of inspection shall be in force one year from date of issue unless in the judgment of the Bureau any elevator is found to be in an unsafe condition. In such cases the certificate shall be removed and the elevator put out of service until it is put in safe running condition.

Section 30. Any person who may feel aggrieved by the decision of any elevator inspector may, within five days after such decision, appeal in writing to the Bureau. All cases in which appeals have been taken shall be referred to the Chief of the Bureau and the four inspectors of elevators designated by the Director of the Department of Public Safety as a Board of Appeal and their decision shall be final: *Provided,* That should the aggrieved party object to the decision of the Board he may further appeal in writing to the Director of the Department of Public Safety, within five days after the decision of the Board of Appeals, specifying in such appeal the reason therefor and accompanying the same by the sum of thirty (30) dollars. The Director of the Department of Public Safety shall thereupon appoint one disinterested elevator expert, the aggrieved party shall appoint one disinterested elevator expert, and the two thus appointed shall choose a third disinterested elevator expert, a majority of whom shall decide the case. They shall be paid ten (10) dollars each for their services. In case the appeal is sustained, the thirty (30) dollars so paid shall be returned to the appellant; otherwise to be forfeited to the City.

Section 31. The elevator inspectors, with the concurrence of the Chief of the Bureau, may require safety appliances in addition to those before mentioned when in their judgment the same may be necessary to better provide for the safety of the public.

The inspection of elevators will be conducted during business hours (8 A. M. to 5 P. M.) and with as little interruption to the business of the establishment as possible. The inspection of pressure tanks need not be conducted during business hours.

The owners and tenants of buildings in which elevators are located, their agents and employees, will be required to admit elevator inspectors at all times and with as little delay as possible, and to give every facility for the prompt execution of all inspections.

Section 32. Every elevator shall be regularly inspected by the Bureau of Inspection, regardless of any other inspection, and no Insurance or Casualty Company's Certificate will exempt any elevator from such inspection.

Approved the fifteenth day of April, A. D. 1908.

JOHN E. REYBURN
Mayor of Philadelphia

AN ORDINANCE

To amend an ordinance entitled "An Ordinance to provide for a Bureau of Inspection of Passenger and Freight Elevators," approved April 15, 1908.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the ordinance entitled "An Ordinance to provide for a Bureau of Inspection of Passenger and Freight Elevators," approved April 15, 1908, is hereby amended by striking out Sections 3, 4, 26 and 29, and inserting in lieu thereof:

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Section 3. Whenever the Chief of the Bureau of Elevator Inspection shall deem it necessary for the safety of the public, he shall have the power to order the discontinuance of the use of any passenger or freight elevator, sling or builder's hoist, and to compel the owner, lessee or agent of the building within which such elevator, sling or builder's hoist is located, or any other person responsible for the running of the same, to make such alterations or repairs as he may deem necessary for the safety of persons and property using or carried upon said elevator, sling or builder's hoist, before the same is again put in use.

The Chief of the Bureau of Elevator Inspection shall have the power to make all rules and regulations for the erection and supervision of builder's hoists.

The Chief of the Bureau of Elevator Inspection shall also have the power to condemn any mechanical part or appliance connected with any passenger or freight elevator, sling or builder's hoist, if the same, in his judgment, is dangerous or unreliable, and whenever any such part or appliance has been condemned, it shall be removed and the elevator, sling or builder's hoist made safe to the satisfaction of the Chief of said Bureau, before being again put in operation.

Whenever any elevator, sling or builder's hoist shall be in need of repairs, in any respect pertaining to the operation of the same, or any of the apparatus or machinery connected with an elevator, sling or builder's hoist shall become impaired, necessitating the temporary disuse of the elevator, sling or builder's hoist, or any accident shall occur in an elevator, sling or builder's hoist, or elevator shaftway, affecting life or limb, it shall be necessary for the owner, lessee or agent of the building in which the said elevator is located, or other person under whose control and management the said elevator, sling or builder's hoist is operated, to notify the Chief of the Bureau of Elevator Inspection of such impairment, disuse or accident, and shall not again put the said elevator, sling or builder's hoist in operation until an inspection has been made and the condition of the elevator, sling or builder's hoist approved by the Inspector.

Section 4. The following fees shall be charged annually for each certificate of inspection and each annual re-issue for each elevator, lift or hoist: For power-driven elevators in buildings eight stories and under in height, ten (10) dollars; for power-driven elevators in buildings nine to twelve stories, inclusive, in height, fifteen (15) dollars; for power-driven elevators in buildings over twelve stories in height, twenty (20) dollars; for hand elevators, five (5) dollars; for hand-power pavement lifts, two (2) dollars; for sling hoists, two (2) dollars. For each builder's hoist in buildings eight stories and under in height, one fee, which shall not be an annual fee, of ten (10) dollars, shall be charged; for each builder's hoist in buildings nine stories and over in height, one fee, which shall not be an annual fee, of fifteen (15) dollars, shall be charged; for tank inspection, one fee, which shall not be an annual fee, of five (5) dollars for each inspection shall be charged.

The foregoing fees shall be collected as fees for inspection are now collected in the Bureau of Boiler Inspection.

Section 26. If any accident shall occur to any elevator, sling or builder's hoist, affecting life or limb, or in any way impairing the strength

or efficiency of said elevator, sling or builder's hoist, it shall be the duty of the engineer in charge of the building, or, in the absence of the engineer, the superintendent, to immediately, and before any broken or damaged part is removed or any steps are taken to repair the said elevator, sling or builder's hoist, notify the Chief of the Bureau of Elevator Inspection of such accident. The Chief of the Bureau of Elevator Inspection shall cause any such accident to be promptly investigated, and the said elevator, sling or builder's hoist shall not be again put in service until after investigation and satisfactory repair.

The owner, agent or lessee of a building will be held responsible for the failure of the engineer or superintendent to promptly report any elevator, sling or builder's hoist accident in said building, or for any negligence on the part of said engineer or superintendent affecting the safety of any elevator, sling or builder's hoist under his control.

Section 29. All power-driven elevators must be inspected at least once every three months after first inspection. All hand-hoist elevators must be reinspected at least once in six months after first inspection. All sling hoists must be inspected at least once a year after first inspection.

Builder's hoists and pressure tanks must be inspected as often as, in the judgment of the Chief of the Bureau of Elevator Inspection, their condition may require.

The first certificate of inspection on any new installation shall be in force one year from the date of issue of said certificate.

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Certificates issued under the afore-mentioned ordinance of April 15, 1908, and in effect at the date of the approval of this ordinance, shall remain in full force and effect until the expiration of their respective terms, and inspections shall be made on such elevators and charged for as provided in Section 4 of the said ordinance of April 15, 1908, until the expiration of the aforesaid certificates.

For elevators that are being operated without the certificates provided for in the said ordinance of April 15, 1908, the fees set forth in this ordinance shall go into effect upon its approval.

In order that there may be no interim between the date of the expiration of any certificate and the date of the payment of the fee for renewal or re-issue of said certificate, such renewal or re-issue shall expire one year from the expiration of the former certificate.

After the expiration of the certificate of inspection of an elevator or sling which is out of service, no fee shall be charged during the time said elevator or sling is out of service.

Whenever any elevator, sling or builder's hoist is found to be in an unsafe condition, the certificate shall be removed and the elevator, sling or builder's hoist kept out of service until it is put in safe running condition.

Approved the nineteenth day of April, A. D. 1917.

THOMAS B. SMITH
Mayor

THE INSTALLATION AND OPERATION OF BUILDER'S HOISTS

In accordance with the Ordinance of Councils of the City of Philadelphia, approved the nineteenth day of April, 1917, by His Honor, the Mayor of the City of Philadelphia, which gives the Chief of the Bureau of Elevator Inspection the power to make rules and regulations for the erection and supervision of builder's hoists, every builder's hoist hereafter constructed or installed shall pay the following fees and conform to the following requirements:

FEES

"For each builder's hoist in buildings eight stories and under in height, one fee, which shall not be an annual fee of ten (10) dollars shall be charged; for each builder's hoist in buildings nine stories and over in height, one fee, which shall not be an annual fee, of fifteen (15) dollars shall be charged."

GENERAL CONDITIONS

Before erecting a builder's hoist, an application must be made to the Bureau of Elevator Inspection, describing the construction of the shaftway, the car, the kind of machine to be used to furnish the power, and the size of the cables to be used. After the builder's hoist has been erected and approved by this Bureau, a certificate must be taken out before the hoist may be put in service.

Where a builder's hoist is to be located outside of the building line of a property, a permit must be obtained from the Highway Bureau.

OUTSIDE BUILDERS' HOISTS

The shaftways of outside builders' hoists must be constructed so that they will have the necessary strength and stiffness to sustain all the various

stresses to which they may be subjected. Such shaftways must be built of sound materials and must be designed and erected to carry the maximum load allowed on the hoist.

The shaftways should be strongly cross-braced and strutted and made secure against overturning in any direction and should be safely guyed or strongly anchored to the building. When used in connection with a high building, they should not be run up to their ultimate height at the outset. All shaftways must be straight and plumb.

When landing platforms are used to connect the shaftway to the building, the platforms must be guarded with railings, 4′ 0″ high and the railings must have toe boards 6″ high; one rail to be two (2) feet above the platform and the top rail to be four (4) feet above the platform.

Where double hoists are used, each hoist must be operated by an engineer. No engineer may operate more than one hoist at any one time.

The cars of all builders' hoists shall be of metal or wood construction. The platform must be securely braced to the stiles by substantial stay rods. The floor must be made of wood at least two (2) inches thick, securely fastened to the car frame.

All cars must be of the side post type substantially built. Suitable guides or blocks must be provided on all cars upon which wheel-barrows are transported to hold the barrows in place. Builders' hoists must not be loaded in excess of seventy-five (75) lbs. per square foot.

CAR ENCLOSURES

All sides of the car not used for loading and unloading must be enclosed with a substantial enclosure, said enclosure to extend to a height of 6′ 0″ or to the upper car beam, if less than that in height.

CAR TOPS

The tops of all cars must be covered with a substantial cover or grille work. If wire mesh is used, it should not be less than No. 10 wire and the mesh to be of such a size as to reject a ball 1½ inches in diameter. The cover must be set back not more than six (6) inches from the landing threshold and be hinged on that landing side, not less than 18 inches back, so as to fall back should the edge of the cover be obstructed in any manner in its descent.

ENCLOSURES

The lower terminal landing of outside builders' hoists should have all sides of the shaft not used for loading purposes solidly enclosed to a height of not less than 6′ 0″. The entrances are to be substantially covered, said covering to extend at least eight (8) ft. from the shaft and to be double the width of the shaft.

The entrances to the shaftway must be protected by a hinged bar to lift up, placed eighteen (18) inches back from the car. The bar to be 4′ 0″ from floor. The entrances between the bars and shaftway must have 4′ 0″ railings, as hereinbefore described.

The machine which is used to operate the hoist and the space around same occupied by the engineer must be properly protected from falling material.

CABLES

After the cable has been fastened to the car, the end must be securely fastened by at least two crosby clamps.

HOISTING MACHINE

Adequate and effective brakes must be provided on all hoisting machines capable of holding the car with a maximum load at any point of travel.

The hoisting machine must also be provided with a pawl and gear, the pawl to be used to hold the load at each landing.

FACTOR OF SAFETY

The factor of safety for builders' hoists must be the same as prescribed by the Bureau of Elevator Inspection for passenger elevators.

OPERATION

No persons will be permitted to ride on an outside builders' hoist. Signs must be posted prohibiting persons from riding on the hoist.

BUILDERS' HOISTS ON THE INSIDE OF BUILDINGS

Builders' hoists on the inside of buildings are to be constructed and operated the same as the outside builders' hoists. In addition to the said requirements, the shaftway not used for loading and unloading must be enclosed with slatted enclosures 6′ 0″ high, slats spaced not over 1½″ apart and kept back 4″ from face of hatchway, and the entrance protected by swinging bars to lift up, placed 18″ back from car, the bar to be four (4) ft. from the floor. Wire mesh No. 10 wire to reject a 1½″ ball may be used in place of slat, or railing 4′ 0″ high, built as hereinbefore described, may also be used, if the railing is kept back at least eighteen (18) inches from the flush line of the shaft.

All cables running through the floor must be properly protected to a height of 6 ft. above the floor.

No person will be permitted to ride on an inside builders' hoist. Signs must be posted, prohibiting persons from riding on the hoist.

FREIGHT ELEVATORS USED AS BUILDERS' HOISTS

A freight elevator (in a new building) where the hatchways, enclosures and gates have not been completed may be used as a builder's hoist, provided the car is enclosed, the hatchway protected and the entrances guarded as required for builders' hoists erected on the inside of buildings.

Such an elevator must be in charge of an experienced operator, approved by this Bureau, and may be used for carrying freight or building materials. Only the operator and the assistants necessary for handling the load, who may not exceed three, are permitted to ride.

A freight elevator used as a builder's hoist must be properly tested and approved by this Bureau and a certificate issued as a builder's hoist before being put in service as a hoist.

PASSENGER ELEVATORS USED AS BUILDERS' HOISTS

A passenger elevator (in a new building) where the hatchways, enclosures and gates have not been completed may be used as a builder's hoist, provided the car is enclosed on three (3) sides, and the hatchway protected as required for builders' hoists erected inside of buildings. No bars will be required at the entrances to the elevator but hinged, slatted gates, 6′

high must be used and the gates must be locked from the inside of the hatch.

A passenger elevator used as a builder's hoist must be properly tested and approved by this Bureau and a certificate issued as a builder's hoist before being put in service as a hoist.

Such an elevator must be in charge of an experienced operator, approved by this Bureau, and may be used for carrying passengers as well as building materials. Three (3) sq. ft. of floor space must be allowed for each passenger.

Builders' hoists may not be operated to carry materials or passengers when men are working around the hatchway.

When a building is completed, the certificate under which any freight or passenger elevator has been operated as a builder's hoist shall become void and a new certificate must be taken out to operate the installation as a freight or passenger elevator.

AN ORDINANCE

To amend ordinance approved April 15, 1908, entitled "An Ordinance to provide for a Bureau of Inspection of Passenger and Freight Elevators."

Section 1. The Council of the City of Philadelphia ordains, That the ordinance approved April 15, 1908, entitled "An Ordinance to provide for a Bureau of Inspection of Passenger and Freight Elevators," be hereby amended in Section 16 by adding the following to paragraph "a":

"Provided, That the provisions of this paragraph shall not apply to passenger cars equipped with a device which automatically stops the car level with the landing. The distance may then be extended to within seven inches of such landing: Provided further, That such device will hold immovable and secure the carriage used in such elevator while any gate, door or doors at the landing that is used for entrance thereto or exit therefrom is or are open and unsecured. The said automatic device, electrical or mechanical, to place the power of controlling the elevator beyond the control of the attendant while any gate, door or doors on the landing leading to the carriage is open and unsecured."

So that the paragraph as amended shall read:

"a. The device must prevent the doors of the landings being opened either from inside or outside, except when the car is within three inches of such landing: Provided, That the provisions of this paragraph shall not apply to passenger cars equipped with a device which automatically stops the car level with the landing. The distance may then be extended to seven inches of such landing: Provided further, That such device will hold immovable and secure the carriage used in such elevator while any gate, door or doors at the landing that is used for entrance thereto or exit therefrom is or are open and unsecured. The said automatic device, electrical or mechanical, to place the power of controlling the elevator beyond the control of the attendant while any gate, door or doors on the landing leading to the carriage is open and unsecured."

Further amend by striking out Section 17 and inserting in lieu thereof the following:

"Section 17. Any interlocking device, which complies with the requirements of Section 16 may be used in connection with a door-operating device."

Approved the twelfth day of June, A. D. 1924.

W. FREELAND KENDRICK
Mayor of Philadelphia

AN ORDINANCE

To amend an ordinance approved the twentieth day of November A. D. 1912, entitled "An Ordinance to amend an ordinance entitled 'An ordinance to provide for a Bureau of Passenger and Freight Elevators,' approved the fifteenth day of April, A. D. 1908."

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the ordinance approved the twentieth day of November, A. D. 1912, entitled "An Ordinance to amend an ordinance entitled 'An ordinance to provide for a Bureau of Passenger and Freight Elevators,' approved the fifteenth day of April, A. D. 1908," be amended by striking out the first paragraph of Section 19, which reads as follows: "All passenger elevators hereafter erected, except the same be of the plunger type, must be provided with air cushions," and inserting in lieu thereof the following: "Passenger elevators hereafter erected or re-erected need not be equipped with air cushions: Provided, however, That any substantial and efficient device for arresting and controlling a falling car which has been, or may be, accepted and approved by the Bureau of Elevator Inspection, may be installed in lieu of an air cushion."

Approved August 15th, 1914.

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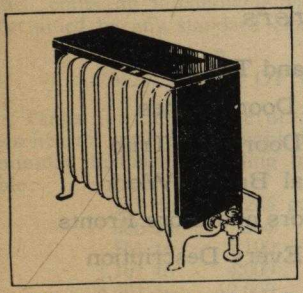

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Relating to: Installation of Domestic Fuel Oil Burners, Booths for Moving Picture Machines, Incinerators

Application must be made prior to the installation of tank at the Mayor's License Clerk, Room 205, City Hall, and approved by the Fire Marshal.

All installations are subject to the inspection of the Fire Marshal's Office; upon completion of the tank and burner, the Fire Marshal's Office must be notified on return Post Card form attached. Separate inspection on either tank or burner can only be made in cases where it is impossible to complete the whole job. Tanks may be backed filled if sufficient opening is left so that the depth of the excavation can be checked as well as suction and return lines coming from the top of the tank.

"Domestic Fuel Oil Burners" shall mean any device designed and arranged for the purpose of burning fuel oil.

The Burner to be used must have the approval of the Fire Marshal.

All Domestic Oil Burners, and all equipment in connection therewith, shall be installed and maintained in accordance with these rules and regulations.

No oil shall be kept for or used in any Domestic Fuel Oil Burner which emits an inflammable vapor below 135 degrees Fahrenheit, to be ascertained by any standard closed-cup tester.

MATERIAL OF CONSTRUCTION—TANKS

Tanks for the storage of fuel oil shall be of galvanized steel, basic open-hearth steel or wrought iron; shall be constructed tight and of a minimum thickness according to the capacity as specified in the following table:

1 to	285	gallons	16	guage
286 to	560	"	14	"
561 to	1,100	"	12	"
1,101 to	4,000	"	7	"
4,001 to	12,000	"	¼	inch
12,001 to	20,000	"	5/16	"
20,001 to	30,000	"	⅜	"

GRAVITY AND PRESSURE TANKS

A tank having capacity of not more than two hundred and seventy-five gallons may be located in the cellar or basement provided it is secured to prevent floating as follows:

a—Two vertical pipes not less than ¾" will be run from basement floor to ceiling or joists, securely held in place by standard floor flanges at top and bottom. These uprights will be so placed that they will be tangent to the side of the tank, the uprights to be not more than 12" from the ends of the tank.

b—Two horizontal pipes not less than ¾" will be run from each of the above mentioned uprights not less than two inches into the masonry wall and securely fastened. These horizontal pipes will be so placed that they will be tangent to the top of the tank.

c—Provided that the tank is located so that it is impossible to have one long side adjacent to a masonry wall or other suitable fireproof partition work, the description given above shall provide for four vertical pipes, i. e., two on each side. The horizontal pipes to be placed between the uprights instead of between the uprights and masonry wall.

d—No above ground tank shall be located nearer than 10 feet measured horizontally from any fire or source of flame and shall be supported by an incombustible material. Gravity feed to the flame is limited to a 55-gallon tank and is only permitted if approved automatic safeguards are provided to prevent abnormal discharge of oil at the burner. Burners equipped with an approved device which positively eliminates the flow of oil through the burner nozzle, when the burner is not in operation, and depends on auxiliary power for the delivery of oil to the nozzle, may be direct connected to the 275-gallon tank, which tank shall not be more than 30 inches above cellar or basement floor.

UNDERGROUND STORAGE TANKS

a—Tanks having an aggregate capacity greater than 275 gallons must be buried. All buried tanks within the building must be located at least four (4) feet from the boiler and two (2) feet below the lowest level of any basement, cellar, vault, pit, elevator shaft, cesspool, sand trap or other excavation, within fifteen (15) feet of the tank.

b—Where tank is outside building and over fifteen (15) feet from any basement, cellar, vault, pit, elevator shaft, cesspool, sand trap or other excavation, except as hereinafter provided, same may be buried with top of tank not less than two (2) feet below the surface of the ground. Where tank is outside building and within fifteen (15) feet of basement, cellar, vault, pit, elevator shaft, cesspool, sand trap or other excavation, top of tank must be below the lowest level of such basement, cellar, vault, pit, elevator shaft, cess-pool, sand trap, or other excavation.

c—Where basement or cellar is over ten (10) feet deep, this must be taken up specifically with the Fire Marshal.

d—Oil from such tanks, whether located inside or outside building, shall be drawn by means of a pump with suction pipe drawing through the top of the tank.

e—An approved anti-syphon arrangement must be installed at the highest point in the supply line of burners that pump directly from a storage tank where the top of the storage tank is above the level of the pump.

MANHOLE

Manholes, if used, shall have covers securely fastened in order to make access difficult by unauthorized persons. No manhole shall be used for filling purposes.

SETTING OF TANKS

a—Tanks must be kept away from all walls a minimum distance of four feet. When excavations are below foundation, the edge of the ditch must be outside of 60° line from bottom of foundation. Any installation requiring a shorter distance, application must be made at the Fire Marshal's Office before the installation is made.

b—Where rock water, or other physical obstacles are encountered in making installation, special approval will be required when the top of the tank is above the floor.

FILLER PIPES

a—All tanks shall have a filler pipe extending from tank to outside of building and provided with proper cap.

b—All underground tanks shall, where possible, have a filler pipe extending from the tank to the curb when necessary to cross sidewalk in order to fill.

VENT PIPE

All tanks shall have a vent pipe not less than one (1) inch in diameter, extending from the tank to the outside of building terminating in a return bend, screened with brass or bronze screen, not less than thirty mesh per linear inch; pipe to extend twelve (12) feet or more above the surface of the ground and placed not less than three (3) feet away from any window or other opening.

PROTECTION TO PIPING

All piping used in connection with Domestic Oil Burners shall be run as directly as possible, shall be without unnecessary pockets, rigidly secured and all joints shall be tight and made up with soft solder, litharge and glycerin or shellac. Standard, full weight, wrought iron, steel or brass pipe with substantial fittings shall be used and shall be carefully protected against mechanical injury. Where it is necessary for these pipes to cross the floor they must be buried. All pipes on floor must be protected with concrete or concentric pipe.

OIL LEVEL INDICATING DEVICE

a—On all tanks inside of building, whether above floor or buried, no sounding or measuring device which must be open to cellar to ascertain level of oil, is permitted. On installations of this kind, approved gauge must be provided.

b—No oil tank used in connection with a Domestic Fuel Oil Burner shall be equipped with a glass gauge, the breaking of which wiill permit the oil to escape from the tank.

STRAINERS

Strainers shall be used in the supply line to burners. These strainers must be so constructed that cleaning may be accomplished without dismantling the pipe line.

PILOT

a—The use of acetylene, or any other gas possessing a wider range of explosibility in admixture with air than coal gas, water gas or oil gas, is prohibited for use in the gas pilot of a Domestic Oil Burner.

b—On all burners that are using electric or gas connection or both, tags bearing the following inscription must be attached to the meter, "OIL BURNER ATTACHED, DO NOT SHUT OFF BEFORE NOTIFYING OCCUPANT, BY ORDER OF THE FIRE MARSHAL." These tags are to be red, not less than two inches in width and four inches in length, printed on both sides.

FURNACE AND BOILERS

a—Stoves or ranges originally designed for use of fuel other than oil should not be used in connection with oil burners unless spaces in which vapors might collect are adequately vented.

b—Dampers which may entirely close the chimney uptake are prohibited. Damper area should be carefully determined in each case, but in no case shall it be greater than 70 per cent. of the internal cross sectional area of the uptake.

c—No combustible material shall be stored within 10 feet of furnace.

INSTRUCTION CARD

a—All Domestic Oil Burners shall be installed and operated in accordance with the rules and directions of the manufacturers thereof, which shall be subject to the approval of the Fire Marshal.

b—A printed copy of the rules and instructions of the manufacturers shall be conspicuously posted near the Domestic Oil Burner.

GENERAL

a—Installations in places of public assembly are governed by different regulations and the matter must be taken up with the Fire Marshal's Office before application is made for same.

b—Where a 2-unit system is installed, a Lalor, Schutte-Koerting, or other approved valve, must be placed on the discharge side of the first pump.

c—Any change from these requirements must be taken up with the Fire Marshal before installation is made.

By JAMES O. MULHERN
Fire Marshal

REGULATIONS OF THE FIRE MARSHAL FOR BOOTHS FOR MOVING PICTURE MACHINES

Wherever possible, moving picture booths and picture machines should be installed outside of building with no communication between booth and building, except, for the operator, the projection of the light and the lookout openings.

SPECIFICATIONS FOR PERMANENT BOOTHS

The sides and ceiling of booths shall be constructed of a framework of not less than 1½ inch by 1½ inch angle irons or channel bars, at least ⅛ of an inch in thickness; to be properly braced to secure rigidity; to be securely riveted or bolted at the joints and to be plastered on both sides with hard adamant plaster without air space and when finished, to be at least 2½ inches in thickness.

The floor of booth (unless directly on fireproof floor of building) shall be of hard adamant plaster at least 2½ inches in thickness, or shall be ½ inch hard asbestos board or asbestos lumber imbedded in cement; the whole to be at least ¾ inch in thickness on a good solid foundation. The purpose of the asbestos floor is to protect from fire and it is not to be depended upon for supporting any weight. All shelving in booth to be built of non-combustible material such as asbestos, slate or similar material and no metal shall be left exposed in booths erected in regularly licensed moving-picture places.

The enclosure to be at least:

6′ x 8′ x 7′ high for one machine,
9′ x 8′ x 7′ high for two machines,
12′ x 8′ x 7′ high for three machines.

and to be properly lighted by incandescent lamps, which must be in vapor-proof globes on a circuit independent of the machine circuit.

The entrance to the booth shall be not less than 2 feet by 6 feet, and shall be protected by a standard fire door, opening outward, arranged to close automatically by metal rope and weight attachment; or by a spring of sufficient strength and tension to keep door normally closed. Door may be made of fireproof material in a framework of angle irons or channel irons, the whole to be made as light in weight as is consistent with rigid and substantial construction.

Door must be closed when machine is in operation. Not more than one lens window and one lookout opening shall be allowed for each machine. The window for the machine shall not be over 6 inches by 12 inches, and the lookout opening for the operator shall not be over 4 inches by 12 inches. Should the lookout opening and the lens window for the machine form one opening, it shall not be over 12 inches by 12 inches. All openings to be protected by gravity doors of not less than ¼ inch asbestos board overlapping all sides of opening at least 1 inch, and to be held open by fine cords which are easily combustible, and approved fusible links of 160 degrees F., located inside the booth. No openings other than those above specified will be permitted in the booth except the necessary openings for ventilation specified hereafter; this restriction applies to additional doors. If spot-lights are used an opening 12 inches by 18 inches will be permitted, protected by a gravity fire shutter.

VENTILATION

Booths must have a permanent fireproof vent, at least 113 square inches in area, from top of booth to the outer air. Vent to have installed in connection with it an exhaust fan to be kept in operation during the entire time the building is occupied by an audience.

The intake pipe from booth to exhaust fan shall be at least five inches in diameter and the outlet pipe from the exhaust fan to be at least four inches in diameter, and to extend into the vent for a distance of at least three feet toward the outer air.

The motor for the exhaust fan shall be connected directly to the red light exit circuit, and to be thrown on and off with that circuit. No wiring or connections for this motor circuit will be permitted in the booth.

The exhaust fan shall be located close to the booth and motor to be readily accessible.

The exhaust fan shall be of sufficient capacity to exhaust at least 150 cubic feet of air per minute. The outfit to be so designed that the air or vapor passing through the fan and vent does not come in contact with the motor proper.

If additional ventilation is desired, it must be by direct connection with the open air in a manner approved by the Fire Marshal.

EQUIPMENT

Electric centers of distribution will not be permitted in booth. All wiring in booth to be in rigid metal conduit except the flexible connections to lamp, the compensare or similar device if used, which connections must be of stranded asbestos-covered wire of size not less than No. 6 B. & S. gauge and protected from mechanical injury.

The lamp used in a motion picture machine must be constructed and installed as follows:

(a) Must be substantially constructed and entirely of metal except where the use of approved insulating material is necessary.

(b) Must be so designed as to provide for proper ventilation and to prevent sparks being emitted from lamp when same is in operation, and mica must be used for frame insulation.

(c) Doors must be provided on side and rear of lamp inclosure, and observation ports not larger than two inches square may be provided when closed with glass.

(d) Lamp must be controlled by a double pole switch within easy reach of operator.

(e) Conductors supplying current to lamp must not be smaller than No. 6 B. & S. gauge or its equivalent. Stranded conductors, provided with approved lugs, must be used between lamp and permanent wiring. A fireproof insulation must be used on conductors inside lamp and those connected to the lamp and resistance. Conductors passing through case of lamp must be protected with porcelain bushings.

The resistance box must be surrounded with a substantially attached metal guard having a mesh not larger than one inch, which guard is to be kept at least one inch from outside frame of rheostat.

All electric wiring must be brought into the booth in iron conduit. Cut out and switch controlling moving-picture apparatus must be inclosed in metal box not less than No. 16 U. S. gauge in thickness. No artificial light shall be used in any booth in which a motion picture machine is installed except that produced by electricity. One light will be allowed for each machine and one for the rewinding bench, but all such lights shall be provided with vapor-proof globes, and reinforced cord shall be used for pendant purposes. If the house lights are controlled from within the booth, an additional emergency control must be provided near the main entrance.

All electrical wiring used in connection with any booth or inclosure containing a motion picture machine shall be subject to the approval of the Chief of the Electrical Bureau.

Booth to be provided with an approved hand extinguisher and one metal bucket of sand for each machine and one for discarded carbons.

The motion picture machines must be securely fastened to the floor to prevent accidental overturning or moving of same.

Applications for inspection must be made at least 48 hours in advance. All booths and equipments for moving-picture exhibitions must be approved by the Fire Marshal.

The above rules are issued and enforced under power vested in the Fire Marshal by Acts of Assembly and Ordinances of Councils.

REGULATIONS OF THE FIRE MARSHAL FOR TEMPORARY BOOTHS

Booths for temporary exhibitions may be made so as to be of a portable character, and can be constructed of either asbestos board or sheet metal.

ASBESTOS BOARD BOOTH

Shall be made of panels of asbestos board at least ¼-inch thick, these panels to be framed with angle iron or other equivalent metal supports, and when assembled to fit close together, without air space, so that the booth is smoke-tight. Floor of booth to be of ⅜-inch asbestos board unless directly on fireproof floor of building, on a good solid foundation. The asbestos floor is for fire protection only, and is not to be depended upon for supporting any weight.

SHEET METAL BOOTH

The sides, ceiling and floor shall be made of heavy sheet metal, not less than 20 gauge, bolted or riveted together, all parts to be made tight fitting and, if necessary, fireproof packing used in joints.

Booths to be in size at least:

6′ x 8′ x 7′ high for one machine,
9′ x 8′ x 7′ high for two machines,
12′ x 8′ x 7′ high for three machines,

and to be properly lighted by incandescent lamps. Door of booth to be of same material as sides and to close with a spring, or metal rope weight, so as to be smoke-proof. All openings in booth, except vent and door to be equipped with flame-proof covers suspended by light thread and approved fusible links inside of booth.

A vent, at least 113 square inches in area, to the outer air must be installed. This vent may be constructed of sheet metal, asbestos cloth, or heavy canvas thoroughly fire-proofed. Canvas can be fire-proofed by soaking the material in a solution of phosphate of ammonia diluted with 10 parts water, or the solution may be applied with a large brush. Other approved fire retardents may be used in place of phosphate of ammonia. The vent pipe may be supported on a framework of metal, wood, iron and steel wire or even of stout rope, or if the above be found impracticable, a method of ventilating approved by the Fire Marshal.

Picture machine must be of standard type.

Wiring for the moving-picture machine must be on an independent circuit not less than No. 6 B. & S. gauge extending from meter board to the booth. Unless the service wires are of sufficient capacity to provide the extra current for the picture machine an additional service must be installed for that purpose. If the service is made to the buss bars of tablet or switchboard, a cutout and switch must be installed at that point.

Booth to be provided with an approved hand extinguisher and one bucket of sand for each machine.

Out-door shows must have a sheet metal booth as specified above with a sheet metal vent at least 113 square inches in area, and extending at least three feet above the roof of booth.

In the case of a single exhibition where the size of booth above specified cannot be used owing to physical conditions, such as a limited amount of space, etc., a booth 5 feet by 5 feet by 7 feet high will be permitted for one machine, provided all other requirements are met.

The operation of moving-picture exhibitions of all kinds is subject to specific rules and requirements of the Fire Marshal, and the same is true of all operators of moving-picture machines.

No exhibition of moving pictures of whatever kind is lawful within the limits of the City of Philadelphia unless a permit is first secured from the Fire Marshal.

Application for inspection must be made 48 hours in advance.

The above rules are issued and enforced under power vested in the Fire Marshal by Act of Assembly, June 8, 1911, and Ordinance of Councils, February 20, 1908. For violations of the same a penalty of one hundred (100) dollars is provided.

AN ORDINANCE

Authorizing the erection of garages facing on alleys or driveways ten feet or more in width.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That a garage may be erected on the rear of any lot in the City of Philadelphia one story in height and not exceeding sixteen by twenty feet interior dimension on any alley or driveway not less than ten feet wide, such garage to be of brick, stone or hollow tile construction, subject to the approval of the Bureau of Building Inspection, according to the Acts of Assembly governing the erection of buildings in the cities of the first class in the State of Pennsylvania.

Approved June 21, 1915.

RESOLUTION

On July 13, 1914, the Bureau resolved to accept one-story stamped steel garages of a size not exceeding 12 by 20 feet, and not exceeding 12 feet in height, provided such buildings are properly anchored to the ground.

Note:—The above applies only to private garages having a frontage on a street of legal width, and does not apply to garages erected on the rear of any lot, and opening on alleys or driveways ten feet or more in width.

REGULATIONS OF THE FIRE MARSHAL GOVERNING INSTALLATION OF GASOLINE TANKS IN GARAGES AND OTHER BUILDINGS.

No tank larger than ten barrels (560 gallons) capacity. No battery of tanks in one property in excess of five tanks of this size. The general piping arrangements to be approved by the Fire Marshal's office for each of the different types of storage outfits.

We quote the following location for tanks, when placed outside of buildings, that are most desirable in the order named.

1. At least thirty feet removed from all buildings on private ground, buried three feet to top of tank below grade.

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

2. At least ten feet away from all buildings where there is a basement and buried a depth to top of tank not less than three feet below basement level.

3. Where limited space will not permit a distance of ten feet between building and tank, where there is a basement, top of tank not less than three feet below basement floor level.

4. Where no basement exists, and limited space only is available adjacent to building, buried three feet below grade.

Note:—The above refers to tanks outside of building. Tanks are equally acceptable placed inside of buildings below basement floor a distance of three feet when the floor level above the tank is the lowest level within a radius of thirty feet of the tank. Where two or more tanks are installed, they are to be separated by a distance of not less than two feet, surrounded with soft earth or sand well tamped into place, or encased in concrete.

December 30, 1927.

Mr. M. S. Graver, Codifier,
c/o Phila. Bldg. Code,
317 Washington Square Bldg.,
Phila., Pa.

Dear Sir:—

In reply to your letter of the 17th instant with reference to the publication of the Philadelphia Building Code and Trade Directory, and in which you ask for regulations issued from our office governing the installation of oil burners and other regulations or rules effecting building construction, we beg to advise you as follows:—

The subject of incinerators has caused much concern to this office for the reason that they have been the cause of several fires. These incinerators have been so constructed so as to have openings into rooms on the interior of the building, and these rooms not being of a fireproof construction and with the doors of the incinerators left open, blocked with paper or in some instances broken off, allowing sparks to emit from the flue causing the rubbish which has been allowed to accumulate in these rooms to catch fire. We have withdrawn our approval of this type of incinerator and have made the requirement to have all openings from same on the outside of building. Regulations covering this type of incinerator can be procured from the Bureau of Building Inspection.

Very truly,

JAMES O. MULHERN
Fire Marshal

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ORDINANCES AND REGULATIONS

Enforceable by the
BUREAU OF HIGHWAYS
(Department of Public Works)
City of Philadelphia

REGULATIONS GOVERNING THE CONSTRUCTION AND REPAIR OF CURBS AND FOOTWAYS

AGENTS AUTHORIZED TO PERFORM WORK

Those who desire to do curb and footway work within the City limits shall first make application and register in the Permit Division, Bureau of Highways. This registration is valid for the calendar year and must be renewed annually thereafter.

Agents authorized to perform curb and footway work are:

First. Those who have been registered in the Bureau of Highways;

Second. Those who have contracts with the City for paving, repaving or resurfacing the streets;

Third. Those who have contracts with the City to perform curb and footway work at the expense of the City or of the property owner;

Fourth. Property owners who are experienced in curb and footway work (or their regular employees who may be similarly experienced) may do such work in front of their property;

Fifth. Public Service Corporations when they are authorized to open the highways under annual permits and when they are doing work approved by the Board of Highway Supervisors.

REGISTRATION

Applicants must reside, or maintain an office in the City. All business must be conducted under the name and from the address given and the Permit Division must be notified promptly of any changes of name or address.

Lists of registered curb and footway workers will be kept on file in the offices of the Permit Division of the Bureau of Highways and in each Highway and Survey District Office, and they will be revised at least once each month.

PERMITS

Permits must be secured before performing work. Those desiring permits shall submit a written application to the Highway District Office accompanied by an order from the owner or agent, or a copy of the notice served through the Highway District Office requiring the work to be done, and by a plan if required. After the necessary investigation and approval, the permit will be issued. If it is marked "LINE AND GRADE REQUIRED," the permittee must make application to the District Surveyor designated upon the permit for the required lines and grades.

All work must be completed promptly or within the time limit specified in the permit. All permits must be kept where the work is in progress. Permits for storing the materials needed will not be required,

provided that the materials are used as delivered. When doing work in the business districts, a portion of the footway shall be kept open for traffic whenever directed. Concrete may be mixed upon the cartway at locations approved by the Highway District Engineer.

Charges for Lines and Grades. In accordance with Ordinance approved September 25, 1924, the fees charged by the Bureau of Surveys for this service shall be as follows:

For furnishing regulation for original curb, fifty feet or less..	$4.00
For furnishing regulation for resetting or replacing curb, twenty-five feet or less	2.50
And for each additional foot continuously furnished on one street	0.03
On curved streets the above charges shall be doubled.	
For curved corners, for each corner, additional to above charge	3.00
For curved corners, for each corner, where separately furnished	4.00
For curb heights for new buildings, fifty feet or less of property	4.00
And for each additional foot continuously furnished	0.03

Expiration of Permits. Permits are void if work is not started before the date noted upon the permit, or in any case within thirty (30) days after the date of issue. All permits will terminate at the end of the calendar year.

UNAUTHORIZED AND DEFECTIVE WORK

Section 8 of the Ordinance approved August 15, 1916, provides for a fine of $20.00 for anyone who shall unlawfully . . . . . perform curb and footway work. This shall be taken to mean work performed by any person not registered; work performed by any person, whether registered or not, if a permit has not been issued, except that any property owner can make repairs to as much of his sidewalk as is necessary to remedy dangerous conditions; work performed under a permit requiring lines and grades, when these lines and grades have not been given; and work constructed which is not in accordance with the lines and grades, the standard specifications, or these regulations. In all such cases the illegal work shall be considered defective and subject to the same regulations that apply to curbs or footways in need of repairs.

The original permit issued for the defective work may be cancelled and another permit issued if necessary. Any offender will be refused further permits, his name will be stricken from the registered list, and placed upon the Delinquent List of the Bureau of Highways.

Section 9 of this Ordinance authorizes the City to remove any defective or unauthorized footway or driveway pavement or curb, to complete this work in accordance with the standard specifications of the Bureau of Highways, and to file liens for the cost and expense thereof, including the cost of the removal of the defective and unauthorized work, as is provided in Section 3 of this Ordinance.

STANDARD TYPES OF CONSTRUCTION

CURBS

The type of curbs to be placed on any street will be designated by the Highway District Engineer in accordance with the following conditions:

1. Straight Curbing.

(a) Portland Cement Concrete. Portland cement concrete curbing, 8 inches in thickness, will be considered the general standard for use on residential or other light traffic streets, except under such conditions as hereinafter noted. Cement concrete curbing, 6 inches in thickness is permitted only where necessary to repair existing curb of the same character and will not be permitted for an entire frontage of one property.

(b) Granite. Granite curbing, 8 inches or 6 inches in thickness, will be required on main business streets, on principal thoroughfares, and on narrow streets carrying considerable traffic or on which street railway tracks are located. Granite curbing, 8 inches in thickness or greater, may be used at any location where desired by the property owner, except that where a thickness of greater than 8 inches is used the installation must not be less than fifty (50) feet or the full lot front.

(c) Bluestone. Six-inch bluestone curbing may be used for replacement on streets where the existing curbing is bluestone or concrete, when approved by the Highway District Engineer.

Five-inch bluestone curbing will be permitted only for repairs or replacements of short length.

2. Curved Curbing.

(a) Cement Concrete. Curved concrete curbing may be used under conditions cited for straight concrete curbing, except adjacent to open mouth inlets.

(b) Granite. Curved granite curbing 8 inches in thickness shall be used at all corners subjected to grinding traffic and adjacent to all open mouth inlets.

Six-inch curved granite curbing may be used at corners where required to join with existing 6-inch straight curbing of any character in locations not subjected to excessive grinding traffic.

FOOTWAYS

The standard footway paving shall be Portland cement concrete laid with a uniform transverse slope of ⅜ of an inch to the foot for the entire width of the footway.

Materials. Any other materials, including paving bricks, blocks, tiles, and other materials with rough surfaces, laid in a cement-sand bed upon a concrete foundation will be permitted only with the approval of the Highway District Engineer. The use of advertising devices will not be permitted. Metal plates cannot be used excepting those containing the name of the footway contractor which shall be placed within three feet of the property line.

Width. All footways shall be paved for the entire width excepting in residential and suburban districts where a lesser width may be paved with the approval and under the direction of the Highway District Engineer. Opposite unimproved ground or any other location where directed by the Highway District Engineer, a temporary brick or flagstone pavement may be laid with a width of not less than 4 feet. This pavement shall be replaced by a pavement of standard type and width when the adjacent property is improved or when the demands of pedestrian traffic warrant it.

Replacements. When an existing footway pavement consisting of brick, flagstone or material other than cement concrete is to be renewed, it must be replaced by a footway of the standard type. When a brick or flagstone pavement becomes worn to such an extent that more than twenty-five per cent. of the area requires repairing or replacing, the entire area

shall be repaved with a cement concrete pavement. Otherwise, repairs may be made with materials of the same character.

Transverse Slope. The transverse slope of all sidewalks starting at the curb line and extending to the property line shall be three-eighths inch to the foot and in accordance with the ordinance approved August 15, 1916. This shall include all original sidewalks; sidewalks completely reconstructed and extensions to sidewalks where sections or strips are already in place. Such sections or strips must be so built as to conform in the laying of a complete sidewalk pavement to the uniform grade of three-eighths of an inch to the foot from the curb line to the property line. In all cases where the said section or strip will not conform to this rate of grade, it must be reconstructed when a complete or full width footway is constructed.

Driveways Across Sidewalks. Unless otherwise directed, all driveways across sidewalks shall be constructed with Portland cement concrete in accordance with the approved designs and the standard specifications of the Bureau of Highways. At locations where unusual wear is anticipated, including entrances to industrial establishments, public garages, entrances to alleys and driveways which give access to the public to the rear entrances of residences and their private garages shall be constructed with approved materials in accordance with plans to be approved by the Highway District Engineer and the standard specifications for the character of material specified. For all locations where unusual conditions are encountered, or for driveways over twelve feet in width, a sketch shall be submitted with the application.

GEORGE H. BILES
Director of Public Works

JOHN H. NEESON
Chief of Bureau

Revised, March 31, 1927

SPECIFICATIONS FOR CURBING AND FOOTWAY WORK

All curbing and footway work shall conform to the Laws and Regulations governing the Construction and Repair of Curbs and Footways and the provisions of the Ordinance approved August 15, 1916, as same ended June 8, 1922, regulating Curb and Footway Work.

CURBING

Scope of Work. All curbing shall be set to lines and grades given by the District Surveyor. The price bid per linear foot will include all excavation, labor, materials and equipment necessary for the completion of the curbing in place, backfilling and cleaning up to the satisfaction of the Engineer. At all highway intersections, the circular curbing shall be constructed of such a radius as may be directed by the District Surveyor. The contractor shall make all necessary junctions with inlets without additional compensation. Sections of stone curbing set adjacent to inlets shall have square ends through the full depth of the stone and the castings for all inlet covers, stop boxes or other City structures shall be cut into the curbing flush with the top. All inlet walls that are disturbed shall be rebuilt in a workmanlike manner with Portland cement mortar and any inlet stones broken by the contractor shall be replaced by him.

The price bid for furnishing and setting new curbing shall further include the adjustment of existing curbing adjacent to the new curbing in such manner as to avoid the use of pieces less than four feet in length, and to prevent any offset in the curbing.

Restoration of Curb and Footway Pavement. The unit price bid for setting or resetting of curbing shall include the restoration of existing brick footway pavement for a distance of 18 inches back of the curb, the first row of flagstones or the adjacent concrete pavement for an average width of 12 inches. Additional concrete pavement shall be restored at the price bid in the proposal or indicated on the schedule of fixed prices. The foundation of the footway pavement back of the curbing shall be thoroughly compacted by ramming before the brick, flagstone or concrete is restored. All roadway pavement that may be disturbed or displaced by the setting or resetting of curbing shall be restored without additional compensation. When necessary the Contractor shall without additional compensation also provide for proper surface drainage through the curbing by furnishing and placing an iron pipe or sheet iron form.

CONCRETE CURBING

Dimensions. Concrete curbing shall be constructed where shown on the plans or where directed by the Engineer, shall be 8 inches in width and 18 inches in depth, and shall conform to the lines and grades given by the District Surveyor. The curbing shall be in uniform lengths or blocks of 10 feet, except where closures make it necessary to slightly reduce them. Each length of curbing shall be separated during construction by sheet-steel templates ⅛ inch in thickness made to conform with the size of the curbing, these templates being removed after the concrete has developed initial set. Particular attention must be given to insure having all templates set perpendicular between the lengths or blocks, and to have all exposed faces finished smoothly to the certified lines and grades. Expansion joints, ¼ inch in thickness, in which a strip of premoulded asphalt has been placed, shall be located at all changes of grade, ends of sections of curved curbing and at intervals not exceeding thirty (30) feet in other locations. Six inch concrete curbing when permitted shall be constructed to the dimensions and in accordance with the specifications for eight (8) inch curbing, except that the thickness at the top shall be six (6) inches.

Sub-Grading. The Contractor shall excavate to a depth of 22 inches below the top of the finished curbing, and upon this sub-grade shall be placed a bed of clean gravel or sand, 4 inches in depth after thorough ramming, the cost of which shall be included in the price bid per linear foot for curbing. In excavating this trench for curbing, care must be taken not to disturb the natural soil to a greater depth than necessary.

Foundation. Concrete foundation for curbing shall consist of one part Portland cement, three parts fine aggregate and six parts coarse aggregate. It shall be not less than 6 inches in thickness and 17 inches in width and shall be placed when and where directed by the Engineer. After this foundation has become sufficiently hard, the curbing shall be constructed on the center thereof with a bearing for its entire length. The concrete so used will be paid for at the unit price bid in the proposal, or as indicated in the schedule of fixed prices.

Forms. After the sub-grade or foundation is prepared, the Contractor shall furnish and set securely to the lines and grades indicated by the District Surveyor proper forms and templates for the curbing. All forms shall be of steel and of approved design. Any displacement of these forms or frames shall be remedied by the Contractor, and the curbing must conform to the certified lines and grades when completed.

Portland Cement Concrete. The concrete shall be composed of one part of Portland cement, two parts of sand and four parts of crushed stone or pebbles. Sand and stone or pebbles shall conform to the standard

specifications of the Bureau of Highways for fine and coarse aggregate, respectively, for use in Portland cement concrete base and the concrete shall be mixed in accordance with the same specifications. The concrete shall be placed in the forms in layers of 4 or 5 inches, and thoroughly rammed and spaded until mortar entirely covers the surface.

Tangent Joints. Where the curved curbing unites with the tangent curbing, not at a joint in the curbing, there shall be imbedded in the concrete, when put in place, an iron or steel bar ½ inch in diameter and 2 inches in length. The bar shall be placed 5 inches below the top of the curbing and in the center of the width.

Finishing. The forms must be removed within 24 hours after the concrete has been placed, and the entire exposed surface of the curbing shall be finished to a smooth even surface with a wooden float. If any holes or defects develop, they shall be filled at once with mortar composed of 1 part of Portland cement and 2 parts of sand applied with a wooden float. In no case will an application of a thin layer of plaster be permitted after the forms have been removed. The top and 8 inches depth of the face of the curbing shall be flushed with clean water applied with a soft hair brush and finally smoothed to a finished surface with a metal trowel. When completed the curbing shall be kept moist and protected for at least three (3) days.

Armored Concrete Curbing. Armored concrete curbing shall be constructed with the same materials, of the same dimensions, and in the manner stipulated in these specifications for plain concrete curbing. It shall be armored in the following manner: The upper edge of the face of the curbing shall be reinforced and protected by a galvanized steel bar, having a rounded head with a radius of about 1-5/8 inches, and a dove-tailed projection which will extend into the concrete for about 2 inches. The bar shall be supported at intervals of 2½ feet with suitable frogs, which shall extend through the entire width of the curbing. Other types of bar of equal efficiency may be substituted upon the approval of the Engineer.

STONE CURBING

Straight Bluestone Curbing. Bluestone curbing shall be of the best quality North River bluestone, 5 inches or 6 inches in thickness as may be indicated or directed, and 20 inches in depth, and in lengths of not less than 4 feet nor in excess of 8 feet. The top surface shall be dressed and beveled at rate of ⅜ inch per foot, and the face shall be dressed to a depth of 12 inches, and the back to a depth of 3 inches. The top surface and face shall be free from depressions, projections or other irregularities or defects.

Straight Granite Curbing. Granite curbing shall be of first quality granite, neither laminated nor stratified, hammer dressed on the face for at least 12 inches in depth, on the entire top surface, with a slope at the rate of ⅜ inch per foot from the front face, and 3 inches in depth on the back. All joints shall be close through the full depth and width of the stone. Eight inch curbing shall be 8 inches in width on the top, at least 20 inches in depth and not less than 10 inches in width at the base. Six inch curbing shall be 6 inches in width on the top, at least 20 inches in depth, and not less than 8 inches in width at the base. All straight curbing shall be in lengths of at least 6 feet except at closures where one piece not less than four (4) feet in length will be permitted.

Curved Granite Curbing. Curved granite curbing shall be placed at all highway intersections where ordered. Curved curbing shall be in lengths of at least 5 feet. No closure shall be less than 4 feet in length. Curved curbing shall be cut exactly true to the radius ordered, with a tangent if

required. Tangents cut on pieces of curved curbing will be paid for as curved curbing.

Foundation. When directed there shall be placed under each curb joint a slab of Portland cement concrete 18 inches wide, 18 inches long and 8 inches thick. This material shall conform with the standard specifications for concrete for base course and will be paid for at the unit price bid in the proposal or indicated in the Schedule of Fixed Prices.

Joint Filling. Joints of curbing set by the Contractor shall not exceed ¼ inch in width, and shall be thoroughly pointed and back-filled and made water-tight from the base to top of curbing with a stiff mortar, composed of 1 part Portland cement and 2 parts clean sand.

REPAIRS TO AND RESETTING CURBING

Resetting Curbing. All curbing shall be reset to lines and grades furnished by the District Surveyor. The Contractor shall at the price bid for resetting, adjust existing curbing in such manner as to prevent any offset in the curbing. All joints shall be filled with mortar as specified for the setting of new stone curbing.

Redressing Stone Curbing. When directed the Contractor shall redress existing stone curbing on top and for a depth of not less than 10 inches on the face, together with such dressing of the ends as may be required to give joints of the width specified.

Repairs to Concrete Curbing. Repairs to the concrete curbing will include the removal and disposal of all unsound or disintegrated concrete and the nenewal with new curbing 18 inches in depth in accordance with these specifications. The surface of the adjoining old concrete shall be thoroughly wetted and painted with neat cement grout prior to placing the concrete for the new curbing.

FOOTWAY PAVEMENT

Scope of Work. The price bid for laying footway and driveway pavements shall include excavation and compacting of sub-grade, cinder foundation 6 inches in depth, all materials, equipment and labor necessary for the construction of the pavement complete in place, and cleaning up to the satisfaction of the Engineer.

Excavating to sub-grade shall include the removal and disposal of existing old pavement, where necessary or directed.

Driveway pavements shall conform to the latest standard driveway regulations of the Bureau of Highways.

CONCRETE PAVEMENT

Sub-Grading. The footway shall be excavated or filled to the width required and to a sub-grade of 10 inches below and parallel to the grade of the finished pavement. The bed shall be thoroughly compacted by ramming. If the excavation be in solid rock that requires blasting, the sub-grade shall be not less than 8 inches below the finished top.

Base Course. On the sub-grade a foundation of clean cinders, 6 inches in depth, shall be placed, which shall be well compacted by ramming with a rammer weighing at least 75 pounds. The cinders shall be well watered during ramming, and the top surface shall be brought to an elevation of 4 inches below and parallel to the finished surface, which shall have a transverse grade ⅜ inch per foot.

One-Course Concrete Footway. The surface course shall consist of Portland cement concrete composed of 1 part of Portland cement, 2 parts of sand and 4 parts of ¾ inch crushed stone or pebbles which shall conform to the quality specified under fine and coarse aggregates respectively for concrete base course, and shall be deposited in a layer 4 inches in thickness.

The pavement shall be constructed in independent flags not over 30 square feet in area with vertical forms at each end. Where directed the concrete in adjacent flags will be placed on alternate days. The concrete shall be thoroughly tamped and the surface carefully floated to the finished grade of the sidewalk.

Two-Course Concrete Footway. On the cinder foundation shall be placed 3 inches of concrete composed of 1 part Portland cement, 3 parts of sand and 6 parts of crushed stone, or slag, or gravel, which shall be thoroughly compacted.

Before this concrete base has attained its initial set, there shall be placed a surface or wearing course consisting of a stiff mortar composed of 1 part of cement, 1 part of sand and 1½ parts of crushed granite, or stone, or slag of equal quality to be approved by the Engineer, the largest particles of which shall pass through a ½-inch ring and the smallest be retained on a ¼ inch screen, free from dust, loam or earthy substances. The surface course shall be laid to a full depth of 1 inch, and be carefully floated and troweled to a smooth even surface. A drier mixed in the proportion of 1 part sand and 1 part cement shall be sprinkled in a dry state over the surface, and then floated, troweled and indented in a manner to be approved by the Engineer.

Construction Joints. The surface shall be marked into slabs conforming accurately to the joints between the independent flags; and around poles, lamp posts, hydrants, covers over gas and water stopcocks and other structures located in the footways, the pavement shall be cut into blocks of a size to permit the opening of the footway for repairs without disturbing the adjacent footway paving. All joints shall be cut entirely through the concrete, troweled with a small jointer and the edges neatly rounded.

Expansion Joints. Expansion joints ¼ inch in width shall be formed at intervals not exceeding 30 feet by placing a premoulded asphalt strip which shall be not less than 4 inches in depth.

Tinting. Coloring material of the shade and quantity to be approved by the Engineer shall be worked into the surface of the concrete when directed.

Protection. When the pavement is completed it shall be kept covered with canvas for three consecutive days and if laid in warm weather shall be kept moist by sprinkling. During cold weather the pavement shall be protected against freezing by covering with not less than six inches of straw, or other approved material.

Brick Footway Pavement. The footway shall be excavated or filled to the width required, and firmly and uniformly compacted by ramming or rolling to a sub-grade of not less than 9½ inches below and parallel to the grade of the finished pavement, which shall have a transverse grade of ⅜ inch per foot. All soft and spongy places shall be dug out and properly refilled. Upon the sub-grade shall be placed a layer of clean cinders, which, after thorough ramming, shall be 6 inches in thickness. Upon this foundation shall be spread a layer of sharp, clean, bar sand, one inch in thickness upon which the bricks shall be laid. The bricks shall be straight, hard, first quality paving bricks, and shall be lain in herring-bone style. Samples of bricks must be submitted for approval

at least 10 days before it is desired to use them. All the joints shall be swept full of clean bar sand.

Repaving Brick Footway. This work shall consist of removing and disposing of existing worn out bricks, furnishing and laying new brick surface course and 1 inch sand cushion, exclusive of cinder foundation.

FOOTWAY REPAIRS

Repairs to Concrete Footways. Repairs to 1 inch granolithic surface on existing concrete footways shall consist in the removal of this course either for the full area of the flag or section, or as far as the bond has been broken between the old surface and foundation course. The surface of the latter course shall then be cleaned, wetted thoroughly, painted with a coat of neat cement grout and a new surface course, consisting of 1 part of cement, 1 part of sand and 1½ parts of clean, crushed granite trap or pebble grit, shall at once be placed, floated to a suitable finish and protected as provided under specifications for concrete footway pavement. Repairs to concrete footway which include the removal of the concrete for the full depth will be paid for at the unit price bid for paving concrete footway and such work shall be done in accordance with these specifications for concrete footway pavements.

Repairs to Brick Footway Pavement. This work shall consist in the removal of existing bricks, proper shaping and compacting of existing foundation and relaying the best of the existing bricks, together with a 1 inch cushion of approved sand. New bricks shall be supplied for any deficiency which exists and the area so laid will be paid for at the price bid for repaving brick footway.

Repairs to Flag Footway. Repairs to flagstone footway pavement shall consist of resetting the original flagstones on the existing foundation with sufficient sand added to properly bed them. The joints shall be filled with mortar composed of 1 part Portland cement and 1 part clean, sharp sand.

Driveways Across Footways. Driveways across footways shall be constructed with Portland cement concrete, vitrified brick, vitrified block, or granite block, as described below: From the confirmed street line to the line where the driveway falls from the sidewalk level to the cartway level, the driveway shall be constructed at the same elevation and with the same transverse slope as the adjacent footways. The distance between this line and the curb line shall be:

For sidewalks	8 feet or more in width	3 feet
"	between 6 feet and 8 feet in width	2 feet
"	less than 6 feet in width	1 foot

Curved curbing shall be placed at the points where the ends of these inclines at the curb line join with the adjacent sidewalk. The radius of the curb shall be the same as the length of the inclined section. Where driveways are constructed with vitrified block, granite block, or cement concrete, 7½ inches in thickness, for heavy service, the elevation of the incline at the curb line shall be the same as the grade of the cartway paving opposite at the gutter. When driveways are constructed with vitrified brick or cement concrete, for light service, the elevation of the incline at the curb line will be 2 inches above the grade of the cartway paving at the gutter.

Concrete Driveway Pavement. Concrete pavement for driveways shall have a thickness of 5 or 7½ inches for light or heavy service respectively, laid on a 6 inch foundation of clean cinders. This pavement shall consist of Portland cement concrete mixed in the proportions of one

part of cement, two parts of sand and four parts of stone, all of the same quality and laid in the same manner as specified for concrete footway pavement. Where concrete curbing is constructed in connection with and opposite a concrete driveway, this curbing shall be of the same cross-section, shall extend to the same depth, and shall be constructed with the same gravel foundation as the adjacent curbing, as shown upon the accompanying plan. The curved curb corners placed in the footway at the ends of the driveways shall be constructed of Portland cement concrete in accordance with the specifications for concrete curbing, or shall be granite curbing, as may be designated by the engineer.

Vitrified Brick Driveways. Vitrified brick driveways shall consist of a surface of footway brick laid on edge upon a 1 inch sand cushion and a 6 inch cinder foundation in accordance with the standard specifications for vitrified brick footways.

Granite Block and Vitrified Block Driveways. Granite block and vitrified block driveways shall be laid with the materials and in accordance with the requirements of the standard specifications and latest regulations of the Bureau of Highways for granite block and vitrified block paving on a 6 inch concrete foundation with cement grout joint filler, except that the vitrified blocks when subjected to the rattler test shall show an abrasion loss not to exceed 28 per cent.

Repairs to Block or Brick Driveways. Where the existing block or brick are in satisfactory condition, repairs to existing driveways may be made by removing the block or brick, reshaping and compacting the sub-grade, supplying new sand cushion not less than two inches in thickness and repaving to the proper grade and surface. The joints shall then be swept full with approved sand.

MISCELLANEOUS

Cinder Footway. Cinder footways shall be constructed of approved clean material to a uniform width of 5 feet and to a depth of 6 inches after thorough compaction. Before placing the cinders the sub-grade shall be graded to afford a smooth surface for the walk. The cinders shall be thoroughly compacted by tamping to give a hard and smooth surface. The cost of sub-grading where necessary is included in the price bid for cinder footways.

Stop Boxes. All water stop boxes replaced shall weigh not less than 6½ pounds each. All sewer lateral vent boxes replaced shall weigh not less than 10¼ pounds each.

Corrected April 15, 1925.

AN ORDINANCE

Relating to nuisances, approved September 23, 1864.

Section 11. To place or maintain any cellar door, porch, or steps, which shall extend more than four feet six inches into any footway of any street fifty feet wide or upwards, or a proportionate distance into any footway in any street of less width than fifty feet.

Section 12. To set up or maintain any fence beyond the building line, or any railing except around excavated areas now existing, so as to reduce the footways of streets of one hundred feet and over in width, to a width of less than sixteen feet; of eighty feet streets to a width of less than fourteen feet; of streets of sixty feet in width to less than twelve feet; of streets of fifty feet in width to a width of less than ten feet, and of all streets of a less width than fifty feet to a width less than eight feet.

AN ORDINANCE

To prohibit the erection of steps, railings or balconies beyond the building line of the streets or highways in a certain section of the city; declaring such projections to be a nuisance, and providing a penalty for the erection thereof, and providing for the collection of the cost of removal.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance it shall be unlawful to erect any steps or railings, any portion of which projects beyond the building line, or any balcony which projects beyond the building line, unless the underside of such balcony shall be at least ten (10) feet above the sidewalk, in that section of the city lying between Vine street on the north and Spruce street on the south, and the Delaware and Schuylkill rivers; these restrictions to apply to both sides of the streets named.

Section 2. Any person who shall construct or begin the construction of any steps, railing or balcony in violation of this ordinance shall forfeit and pay to the City of Philadelphia the sum of fifty (50) dollars for each offense, and shall be required to remove said steps, railing or balcony and replace the street in its proper condition.

Section 3. If the said person or persons shall neglect or refuse to remove such steps, railing or balcony and replace the street in proper condition, as set forth, within ten (10) days from the date of notice from the Department of Public Works, then and in that case the said Department is hereby authorized and directed to have the said work done and the bill for same presented for payment to the owner or owners in front of whose properties said steps, railing or balcony is constructed, and in the event of said owner or owners refusing to pay said bill within ten (10) days from the date thereof, the contractor who did the work shall be paid out of the item for emergencies in the annual appropriation to the Bureau of Highways, and the bill shall be transmitted to the City Solicitor to collect by lien from the owner or owners against whom the work has been charged. The penalty herein mentioned shall be sued for and recovered in the manner as penalties for violation are by law sued for and recovered.

Section 4. All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the nineteenth day of September, A. D. 1912.

RUDOLPH BLANKENBURG
Mayor of Philadelphia

AN ORDINANCE

To provide for the granting and regulating of permits for the occupation of highways with construction materials, fixing the charges therefor, and providing penalties for violation thereof.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain:

Application for and Issuance and Exhibition of Permit. That when any person, firm or corporation shall desire to occupy a portion of the public highways within the City of Philadelphia for the temporary storage thereon of construction materials to be used in connection with the construction or repair of any building, footway pavement or other structure, the prospective permittee shall make a formal application to

the Bureau of Highways, indicating the nature and extent of such contemplated construction or repair work, for the accommodation of which it is desired to so occupy the highways, and thereupon the Chief of the Bureau of Highways may issue a permit to occupy such a part of any public highway as indicated in Section 2 of this ordinance for the purpose aforesaid, for such period of time as he shall deem necessary and reasonable. For the information of the representatives of the Bureau of Highways, the Bureau of Police, and the public, the permit notice card must be displayed by the permittee in a conspicuous location on the occupied highway at all times during the period of such occupancy.

Section 2. Storage of Construction Materials. That construction materials authorized by permit to be temporarily stored on the highways shall not exceed in extent of occupied area the dimensions of the frontage of the premises about to be built upon or repaired (except that when no objection is made by the adjoining property owners and the space is not to be used for storage of materials other than that to be used in reconstruction, the permittee shall be permitted to occupy an additional thirty (30) feet on each side of the building frontage for which the permit is granted), and not exceeding 9 feet in breadth, 13 feet in height and 1 foot inside the curb line, with a gutter left along the curb 15 inches in width and 12 inches in height, with a cleancut hole 12 by 18 inches in size placed every 25 feet of length: Provided, That on narrow highways a sufficient passageway shall at all times be left unencumbered between the outside limit of the stored materials and the opposite curb for the free passage of vehicles: And provided, That no materials, structures or other obstructions shall be placed within 5 feet of any fire hydrant or highway intersection or crossing, or within 2½ feet of any railway track, or across any footway: And provided, That such permit shall not be construed to authorize the permittee to store any old materials, rubbish or dirt on said highways, except such as are to be re-employed in the previously indicated construction or repair operations: And provided, That no permit shall be issued to occupy any highway with building construction materials in that portion of the City between and including Spring Garden street, Fifth street, Green street, Delaware river, South street, Schuylkill river and on Broad street, between Lehigh avenue and Washington avenue.

Section 3. Footway Shelter Platforms. That during the erection or repair of any building, it shall be the duty of the permittee to cause to be placed a wooden footway shelter platform, which shall extend along the whole frontage of such building about to be erected or repaired, and which shall project from 2½ feet from the wall thereof to the curb or outer line of the footway pavement, and to be at least 10 feet in height from the curb or surface of the footway pavement, and shall be of sufficient strength to intercept the falling of bricks, stone, iron, lumber or other building materials or debris. Footway shelter platforms must be in accordance with the drawings and specifications as approved by the Bureau of Building Inspection and on file in the Bureau of Highways, and must be painted in oil a dark green. Advertising signs will not be permitted on footway shelter platforms, except those containing the names of the general contractor and the future tenant, and these signs shall be erected in conformity with the standard size and design approved by the Art Jury (sign to be painted green and white and not larger than 6 feet by 4 feet). In no case will any other signs be permitted nor will the approved signs be allowed to extend below the roof deck of the shelter platform. The Chief of the Bureau of Highways shall have authority to grant permission for the temporary closing or inclosing of a footway where he may deem this a safeguard during the demolition, construction or repairing of any building.

You'll find the Classified Building Trade Directory, toward the end of the book, a great convenience. Use it.

Section 4. Danger lamps and signals. That all persons or agencies temporarily storing construction materials of any kind, or any other obstructions, or making excavations, upon or across any public highway, shall place and maintain thereon, from sunset to sunrise, a lighted red lamp, and whenever such obstructions or excavations exceed 10 feet in length or breadth, one such lamp shall be placed upon each end thereof, and at such other locations and intervals as may be necessary to properly warn and safeguard traffic.

Section 5. Mortar Beds and Material Heaters. That no person or agency shall place any lime or cement mortar, or mixtures, or mortar or concrete beds, or lime boxes, or shall make any fire for the melting of solder, or for the heating of roofing material, or for any other purpose, on paved public highways: Provided, however, That mortar or concrete may be mixed in boxes, the bottoms of which must be tight, tongued and grooved boards, placed on substantial bearers, leaving an air space of at least 4 inches, and protected on all sides by a margin of 2-inch boards extending not less than 6 inches in height above the floor surface.

Section 6. Conditions of Occupied Highway. That the permittee shall store the materials occupying the highway in such a manner as to prevent their creating dangerous conditions or a nuisance or encroaching outside of the limits authorized by the permit. The permittee shall also maintain both the occupied area and the areas adjacent thereto in a cleanly condition satisfactory to the Chief of the Bureau of Highways and shall promptly remove all dirt, sweepings, waste materials, rubbish or other debris that may be produced or accumulate, and, if necessary, sprinkle the occupied area and that adjacent thereto as often as may be necessary to eliminate any dust that may result from the exercise of the privileges granted by the permit. All offenders against the provisions of this ordinance will be prosecuted in accordance with the provisions herein, and when necessary the Chief of the Bureau shall remove at the expense of the permittee or owner of the abutting property any construction materials, dirt, sweepings, waste materials, debris, or rubbish arising from the exercise of the permit privileges, or of any structure, fixture or obstruction found on any of the highways of the City of Philadelphia contrary to the provisions and requirements of this ordinance.

Section 7. Permit Charges. That at any time when the said permit shall expire, if it shall appear necessary that a further use of the highways is required, for the purposes for which said permit was originally granted, the Chief of the Bureau of Highways shall, upon the original application made, extend such permit from time to time, and upon the original issue and extension of every permit the applicant shall pay to the Receiver of Taxes for the use of the City of Philadelphia, the following sums:

Unpaved Streets. For permits to occupy unpaved highways with construction materials, the following charges shall be made monthly: For one building of 40 feet or less frontage, two (2) dollars per month; for additional frontage of the same building the sum of one (1) dollar per month for each additional 40 feet or fraction thereof; for more than one building when immediately adjoining the first building or buildings, a charge of twenty-five (25) cents per month for each additional building.

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The following charges may, at the option of the builder, be made for the entire term of the building operation:

For one building of 40 feet or less frontage, the sum of four (4) dollars for the entire term of the operation; for additional frontage of the same building, the sum of two (2) dollars for each 40 feet or fraction thereof for the entire term of the operation; for more than one building when immediately adjoining the first building or buildings, a charge of fifty (50) cents for each additional building for the entire term of the operation.

The maximum charge for an entire operation on one side of the street and within the ordinary city block, between two main highways, a charge of six (6) dollars for the entire term of the operation.

The maximum charge for an entire operation on both sides of the street and within the ordinary city block between two main highways, a charge of twelve (12) dollars for the entire term of the operation.

Paved Streets. For permits to occupy paved highways with construction materials, the following charges shall be made monthly: three (3) dollars per month for the first building having a frontage of forty (40) feet or less, and two (2) dollars for each additional building, when immediately adjoining the first building or buildings, having a frontage of forty (40) feet or less; for the second and succeeding months, two (2) dollars per month for the first building and fifty (50) cents per month for each additional building when immediately adjoining the first building or buildings: Provided, That if the operation does not exceed one year in duration, the total charge to be made against any builder for all operations on one side of an ordinary city block between two main highways shall in no case exceed twenty-five (25) dollars, and if both sides of the block are occupied, shall not exceed forty-five (45) dollars. If, however, the year is exceeded, the maximum charge to be made against any builder in a city block shall be three (3) dollars per month if one side of the street is occupied, and six (6) dollars per month if both sides of the street are occupied, for each month in excess of the year.

Shelter Platforms. In the section of the City where building material is prohibited upon the streets, and footway shelter platforms are required, the following charges will be made per month:

$2.00 per month for any frontage less than 40 feet.
$3.00 per month for any frontage of 40 feet and less than 60 feet.
$4.00 per month for any frontage of 60 feet and less than 80 feet.
$5.00 per month for any frontage of 80 feet and less than 100 feet.

In other words one (1) dollar additional for each and every 20 feet additional building frontage.

Section 8. Revocation of Permits. That the Chief of the Bureau of Highways shall have authority and power to immediately revoke or annul any permit when, in his opinion, the privileges of the permit have been abused or the provisions and requirements of this ordinance violated, or when any construction or repair work is so far advanced as to render any further occupancy of the highways unnecessary.

Section 9. Violation of Ordinance. That if any person or agency shall occupy any part of the public highways in the City of Philadelphia with construction or other materials or obstructions without a permit as aforesaid, or shall so occupy the highways after such permit has expired, or if, having obtained such a permit, shall occupy said highways in any way, or for any purpose contrary to the provisions and intent of this ordinance, or shall otherwise violate the provisions of this ordinance, the permittee

and the owner of the abutting property for the accommodation of which any highway shall have been used, or the permit shall have been issued, or either of them, shall forfeit and pay the sum of (10) dollars per day for each and every day the violation exists which shall be sued for and recovered in the manner as penalties for breach of ordinance are by law recoverable.

Section 10. All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved the tenth day of July, A. D. 1917.

THOMAS B. SMITH
Mayor of Philadelphia

AN ORDINANCE

To regulate the construction and reconstruction of vaults under the streets of the City, and to provide for the enforcements of such regulations.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance it shall be unlawful to erect, construct or re-construct any vault under the sidewalks of the streets of the City of Philadelphia, unless the outside top of said vault shall be at least four (4) feet below the established grade of the sidewalks over the same.

Section 2. Any person or persons who shall erect, construct or re-construct, or begin the erection, construction or re-construction of any vault under the streets of the City of Philadelphia, in violation of this ordinance, shall forfeit and pay the sum of one hundred (100) dollars for each offense, and a further sum of twenty-five (25) dollars per day for each day the said vault is permitted to remain after notice from the Department of Public Works (Bureau of Highways) to remove the same and restore the street to its proper condition. The penalty herein mentioned shall be sued for and recovered in the manner that penalties for violation of an ordinance are by law sued for and recovered. All ordinances or parts of ordinances inconsistent herewith be, and the same are hereby repealed.

Approved March 31, 1902.

AN ORDINANCE

To regulate the projection of footings of walls, piers or columns beyond the building line in the City of Philadelphia.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That from and after the passage of this ordinance the Bureau of Highways shall have the privilege to allow the projection of footings of walls, piers or columns three feet beyond the building line: Provided, That on streets used or proposed to be used for subways, elevated railways or other public improvements necessitating the use of the bed of the street, such footings shall be constructed within the building line: And provided further, That in the event of any future public improvements necessitating the reclaiming of the bed of any street by the City, any such projections which may have been constructed shall be removed by the owner of the property affected, at his expense.

Section 2. The term "footings" in this ordinance shall be construed to mean the spreading courses at the base of a foundation wall, pier or column.

Section 3. Any person or persons, firms or corporations, whether owner, builder, contractor, architect or workman, who shall construct any footings in violation of any of the terms of this ordinance and who shall omit, neglect or refuse to comply with said ordinance within thirty days after notice to that effect, shall forfeit and pay for each violation the sum of seventy-five (75) dollars, and the further sum of fifty (50) dollars for every period of one month for which the said person or persons shall omit, neglect or refuse to comply. All the aforesaid penalties to be recovered as penalties of equal amount are, or shall be recoverable, in the name and for the use of the City, and, when collected, shall be paid into the treasury thereof.

Section 4. All ordinances or parts of ordinances inconsistent herewith be, and the same are, hereby repealed.

Approved April 25, 1919.

AN ORDINANCE

To amend an ordinance entitled "An Ordinance to authorize and regulate the erection and construction of iron awnings over the sidewalks, and authorizing the Chief of the Bureau of Highways to issue permits therefor," approved March 22, 1900.

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That the ordinance entitled "An Ordinance to authorize and regulate the erection and construction of iron awnings over the sidewalks, and authorizing the Chief of the Bureau of Highways to issue permits therefor," approved March 22, 1900, is hereby amended by striking out Sections 1, 2, 3, 4 and 5 and inserting in lieu thereof the following:

Section 1. The Select and Common Councils of the City of Philadelphia do ordain, That no one shall erect or maintain a metal or glass awning over a sidewalk without obtaining a permit therefor from the Chief of the Bureau of Highways.

Section 2. No such awning shall extend more than four (4) feet from the building line except in front of railroad stations, theatres, hotels, which may have one such awning extending to the curb in front of one door of the building facing on each street from which it may have an entrance. Every such awning shall leave at least ten (10) feet clear head room over the sidewalk, and no sign of any kind shall be displayed thereon.

Section 3. The Chief of the Bureau of Highways may issue a permit for the erection of such an awning if the plans and specifications thereof are approved by him and are in conformity with the provisions of this ordinance, and the proposed awning appears to him to be otherwise desirable at the location selected.

Section 4. Permits shall also be required for all repairs or alterations to existing metal or glass awnings, which may be granted if the proposed repairs or alterations are satisfactory to the Chief of the Bureau of Highways.

Section 5. Every applicant shall pay to the Receiver of Taxes, for every permit issued for the erection or the repair or alteration of such awnings, before such permit is issued, the sum of three (3) dollars.

Approved the seventeenth day of June, A. D. 1915.

RUDOLPH BLANKENBURG
Mayor of Philadelphia

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1925 "NATIONAL ELECTRICAL CODE"

The National Electrical Code was originally drawn in 1897 as the result of the united efforts of the various insurance, electrical, architectural and allied interests which, through the National Conference on Standard Electrical Rules, composed of delegates from various national associations, unanimously voted to recommend it to their respective associations for approval or adoption; and is here presented by the National Board of Fire Underwriters with the various amendments and additions which have been made since that time.

The National Conference having disbanded, the work of the Underwriters' National Electric Association of the National Conference has been taken over by the National Fire Protection Association, which now acts as sponsor for the project under the rules of procedure of the American Engineering Standards Committee.

The following organizations, some of which were members of the National Conference, are represented on the sectional Electrical Committee of the National Fire Protection Association:

American Electric Railway Association.
American Institute of Architects.
American Institute of Electrical Engineers.
Association of Edison Illuminating Companies.
Association of Electragists, International.
Associated Manufacturers of Electrical Supplies.
Board of Fire Underwriters of the Pacific.
Bureau of Standards.
Electric Power Club.
Electrical Department, City of Chicago.
Electrical Department, Oakland, California.
Electrical Supply Jobbers' Association.
Factory Insurance Association.
Industrial Commission of Wisconsin.

Inspection Department, Associated Factory Mutual Fire Insurance Companies.
Institute of Radio Engineers.
International Association of Industrial Accident Boards and Commissions.
International Association of Municipal Electricians.
Louisiana Fire Prevention Bureau.
Missouri Inspection Bureau.
Mutual Fire Prevention Bureau.
National Association of Building Owners and Managers.
National Electric Light Association.
National Board of Fire Underwriters.
New England Insurance Exchange.
New York Board of Fire Underwriters.
Philadelphia Fire Underwriters' Association.
South-eastern Underwriters' Association.
Suburban Fire Insurance Exchange.
Telephone Group.
Underwriters' Association of the Middle Department.
Underwriters' Laboratories.
Western Association of Electrical Inspectors.

ARTICLE 1. DEFINITIONS

Accessible. Not permanently closed in by the structure or finish of the building. (See readily accessible.)

Adjustable Speed Motor. One in which the speed can be varied gradually over a considerable range, but when once adjusted remains practically unaffected by the load, such as shunt motors designed for a variation of field strength.

Approved. Acceptable to the Inspection Department having jurisdiction. In order to avoid the necessity for repetition of examinations by different examiners, frequently with inadequate facilities for such work, and to avoid the confusion which would result from conflicting reports as to the suitability of devices examined for a given purpose, it is necessary that such examinations should be made under standard conditions, and the record made generally available through promulgation by organizations properly equipped and qualified for experimental testing, inspections of the run of goods at factories, and service-value determinations through field inspections.

Automatic Door. One which closes automatically by means of a device operated by heat.

Branch Circuit. That portion of the wiring system extending beyond the final set of fuses or circuit breakers protecting it, and at points on which current is taken to supply fixtures, lamps, heaters, motors and current consuming devices generally.

Building. A structure which stands alone or which is cut off from adjoining structures by unpierced fire walls.

Cabinet. An enclosure designed either for surface or flush mounting, and provided with a frame, matt or trim, in which swinging doors are hung. (See cutout box.)

Cable. A standard conductor (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable.)

Concealed. Rendered permanently inaccessible by the structure or finish of the building.

Conductor. A wire or cable suitable for carrying an electric current.

Cutout Box. An enclosure designed for surface mounting and having swinging doors or covers secured directly to and telescoping with the walls of the box proper. (See cabinet.)

Disconnecting Switch. Disconnector. A switch which is intended to open a circuit only after the load has been thrown off by some other means.

Dustproof. So constructed or protected that an accumulation of dust will not interfere with its successful operation.

Dust-tight. So constructed that dust will not enter the enclosing case.

Enclosed. Surrounded by a case which will prevent accidental contact of a person with live parts.

Factory Yard. A plot containing an assemblage of buildings served by an isolated plant, or by a sub-station, or by a master service, and permitting access from building to building within the yard.

Guarded. Covered, shielded, fenced, enclosed or otherwise protected, by means of suitable covers or casings, barriers, walls or screens, mats or platforms, to remove the liability of dangerous contact or approach by persons or objects to a point of danger.

Isolated. Not readily accessible to persons unless special means of access are used.

Isolated Plant. A private electrical installation deriving energy from its own generator driven by a prime mover.

Outlet. A point on the wiring system at which current is taken to supply fixtures, lamps, heaters, motors and current consuming devices generally.

Panelboard. A panel containing busses and fuses with or without switches for the control of light, heat or power circuits of small individual as well as aggregate capacity and usually placed in or against a wall or partition and accessible only from the front. (See switchboard.)

Qualified Person. One familiar with the construction and operation of the apparatus and the hazards involved.

Readily Accessible. Able to be reached quickly without climbing over or removing obstructions or resorting to chair, box or portable ladder. (See accessible.)

Service. That portion of the supply conductors which extends from the street main to the service switch of the building supplied.

Special Permission. The written consent of the head of the inspection department having jurisdiction.

Switchboard. A large single panel, frame or assembly of panels, on which are mounted, on the face or back or both, switches, fuses, or other automatic protective devices, busses and usually instruments. Switchboards are generally used in generating stations, substations or isolated plants for the direct control of energy derived from generators or transforming apparatus. (See panelboard.)

Totally Enclosed Motor. A motor which is so completely enclosed by integral or auxiliary covers as to practically prevent the circulation of air through the interior. Such a motor is not necessarily air tight.

Ventilated. Provided with a means to permit circulation of the air sufficiently to remove an excess of heat, fumes or vapors.

Waterproof. So constructed or protected that moisture will not interfere with its successful operation.

Watertight. So constructed that moisture will not enter the enclosing case.

ARTICLE 2. GENERAL

The following recommendations, as well as other recommendations throughout this code, shall be considered advisory, but not mandatory:

It is recommended that in all electric work conductors, however well insulated, be always treated as bare, to the end that under no conditions existing or likely to exist, can a ground or short circuit occur, and so that all leakage from conductor to conductor, or between conductor and ground, may be reduced to the minimum.

It is recommended that in all wiring special attention be paid to the mechanical execution of the work. Careful and neat running, connecting, soldering, taping of conductors, and securing and attaching of fittings, are especially conducive to security and efficiency.

It is recommended that in laying out an installation, except for constant-current systems, every reasonable effort be made to secure distribution centers located in easily accessible places, at which points the cutouts and switches controlling the several branch circuits can be grouped for convenience and safety of operation. The load should be divided as evenly as possible among the branches, and all complicated and unnecessary wiring avoided.

It is recommended that wire-ways be used for rendering concealed wiring permanently accessible.

It is recommended that architects when drawing plans and specifications make provision for the channeling and pocketing of buildings for electric light or power wires, and also for telephone, district messenger and other signal system wiring.

201. GAUGES

a. All wire sizes are given in the Brown and Sharpe (American) gauge.

202. VOLTAGES

a. Low Potential shall mean 600 volts or less.

b. High potential shall mean between 601 volts and 5000 volts.

c. Extra high potential shall mean above 5000 volts.

d. In the preceding paragraphs the potential considered is that at which the circuit operates, whether it is supplied by a generator or by a transformer.

e. Throughout this code, unless otherwise specifically stipulated, the requirements shall be considered to be based upon the use of low-potential wiring, devices, apparatus and appliances. High potential and extra-high-potential systems are considered in articles 3 and 50.

203. WIRE TERMINALS, SPLICES AND JOINTS

a. Wires larger than No. 8 shall be connected to terminals by soldering into lugs or by solderless connectors, except that branch or tap connections from which not more than 30 amperes are taken may be made by means of suitable clamps. Stranded wires, other than those used in flexible cords, shall be soldered together before being fastened under clamps or binding screws.

b. Wires shall be so spliced or joined as to be mechanically and electrically secure, without solder. The joints shall then be soldered, unless made with a splicing device, and shall be covered with an insulation equal to that on the wires.

204. RAILWAY SYSTEMS

a. Lighting and power from railway wires shall not be permitted under any pretense from a system to which are connected trolley wires with a ground return, except in electric railway cars, electric car houses, power houses, passenger and freight stations connected with the operation of electric railways.

205. APPROVED MATERIAL, ETC.

a. This code shall be understood to treat only of approved materials, devices, fittings, appliances, machinery, apparatus and methods.

206. GENERAL PLAN OF INVESTIGATIONS

a. Materials, devices, fittings, apparatus and appliances designed for use under this code shall be judged chiefly with reference to the following five considerations which also determine the classification by types, sizes, voltages, current capacities and specific uses:

1. Suitability for installation and use in conformity with the requirements of this code.

2. Mechanical strength and durability, including, for appliances designed to enclose and protect other equipment, the adequacy of the protection thus provided.

3. Electrical insulation.

4. Heating effects under normal conditions of use and also under abnormal conditions liable to arise in service.

5. Arcing effects.

b. Bases for the mounting of live parts shall be composed of approved non-combustible, non-absorptive insulating material, and the design shall be such that, considering the material used, the base will withstand the most severe conditions liable to arise in service. Holes for supporting screws shall be so located or countersunk that there will be at least ½ inch, measured over the surface, between the screw head or washer and the nearest live metal part, and in all cases, where between parts of opposite polarity, the screw head or washer shall be countersunk. Holes for supporting screws in link fuse cutout bases shall be kept outside the area included by the outside edges of the fuse terminals. Nuts or screw heads on the under side of the base shall be countersunk and sealed with a waterproof compound.

c. Terminal parts by which wire connections are made shall insure thoroughly good connections even under hard usage. For currents above 30 amperes, lugs into which the connecting wires may be soldered, or approved solderless connectors, shall be provided. For currents of 30 amperes or less the parts to which wiring connections are made shall securely grip the conductors. Heavy clamps or screws with terminal plates having upturned lugs, or solderless connectors, may be used.

Lugs or clamps are not required when leads are provided as part of the device.

d. The set screw form of contact shall not be used.

e. All devices provided with terminals for the attachment of wires and intended for connection to more than one side of the circuit shall, unless specifically excepted, have a pair of connecting terminals properly marked for identification, unless the electrical connection between the pair of terminals intended to be connected to the grounded conductor is clearly evident. This requirement shall become effective April 1, 1926.

f. The terminals of devices having a normal current rating of over 30 amperes need not be marked for identification.

g. The terminals of utilization devices need not be marked to indicate the proper connection to the grounded conductor. If the terminals on utilization devices, including single-pole switches are marked, the switch shall not be placed in the identified side of the circuit.

h. The terminals of portable devices need not be marked for identification.

i. Devices, to the terminals of which only one side of the line is connected, need not have terminals marked for identification.

j. Rosettes, attachment plug receptacles without screw shells, and attachment plug caps need not have their terminals marked for identification. When terminals of polarized receptacles for attachment plugs and attachment plug caps are marked for identification, the terminal intended for connection to the grounded wire shall be the marked terminal.

k. Three-wire attachment plug receptacles and three-wire attachment plug caps in which one terminal may be used for the connection of a grounding conductor, shall have such terminal identified in a manner differing from that specified in paragraph m of this section.

l. In the case of devices with Edison screw shells, the identified terminal shall be the one connected to the screw shell. This does not apply to screw shells which serve as plug fuse receptacles.

m. The marking of terminals shall be done by means of a metallic plated coating substantially white in color, as nickel or zinc, or the terminals may be of material substantially white in color. The other terminals shall be of a readily distinguishable difference in color.

n. In the case of screw shell devices with attached leads, the wire attached to the screw shell shall have white or natural gray finish. The finish of the braid on the other conductor shall be of a solid color that will not be confused with the white or natural gray finish which is to indicate the grounded conductor.

o. The maker's name, trademark or other identification symbol shall be placed on fittings and materials, together with such other markings giving voltage, current, wattage or other appropriate ratings as are prescribed elsewhere in this code.

ARTICLE 3. OUTSIDE SUPPLY LINES

301. LINE WIRES

a. Line wires shall be so placed that moisture is not liable to form a cross connection between them. They shall not be in contact with anything but their supports. They shall be not less than one foot apart except when in conduit or multiple-conductor cable or on approved racks or brackets.

b. Line wires shall be at least eight feet above the nearest point of buildings over which they pass, and if attached to roofs the roof structures shall be substantially constructed. Wherever feasible, wires crossing over buildings shall be supported on structures which are independent of the buildings.

302. JOINT LINES

a. Electric light and power wires shall not be placed on the same cross-arm with telegraph, telephone or other signal wires which enter any building. An exception is made for wires used only for operating purposes by an operating utility and entering buildings used for such purposes. When placed on the same pole with such wires the distance between the two inside pins of each cross-arm shall be not less than 24 inches for circuits operating at a potential to ground not exceeding 300 volts, and shall be not less than 30 inches for higher potentials.

b. The grounding of metallic sheaths of cables shall conform to the requirements of article 9 of this code.

303. TROLLEY WIRES

a. Trolley wires shall be doubly insulated from the ground, wooden poles being considered as one insulation.

b. Trolley wires and feeders shall be provided with switches which will either disconnect them from the power station, or will so sectionalize them that they may be rendered dead in case of fire along the route.

304. GENERAL

Accidental crosses between different conductors on the same or different pole lines may allow the higher-voltage currents concerned to enter buildings over the lower-voltage conductors over a large section of adjoining territory.

Overhead conductors, if carried close to buildings, tend to hamper the work of firemen in case of fires in the buildings if the raising of ladders is a part of the fire fighting methods employed. With the higher-voltage lines this hampering effect is greater.

It is fully understood that it is impracticable to include in this code rules which will cover in detail all conceivable cases that may arise in overhead line work of such an extended and varied nature, and it is recommended that the inspection department be freely consulted as to the specific methods to be followed in any case of doubt, and that the rules of the National Electrical Safety Code, part 2, be followed.

a. In arranging routes for overhead conductors every reasonable precaution shall be taken to secure locations likely to be permanently useful for the circuits concerned and for necessary developments including the limitation of present and future proximity to other electrical circuits or other pole lines and the appropriate strength, clearances and separations for the proximity concerned.

b. When separate pole lines are carried in nearer proximity than a distance equal to the height of the taller pole line, or where joint poles are used, the appropriate precautions to limit liability of contact shall include the use of wires, cross-arms, pins, insulators, conductor fastenings and poles of appropriate strength. In each such case the minimum clearness and strength shall be those required by the construction rules of the National Electrical Safety Code, Part 2.

c. Open wires of less than 7500 volts between conductors shall be at least three feet horizontally from buildings unless 8 feet higher than the roof. Open wires 7500 volts or more between conductors shall not be installed over buildings other than central stations, sub-stations and transformer vaults. Open wires of voltages between 7500 and 15,000 volts between conductors shall be kept at least 8 feet horizontally, and open wires of more than 15,000 volts between conductors shall be kept at least 10 feet horizontally, from all buildings except those which they serve or central stations, sub-stations and transformer vaults.

d. Where buildings exceed three stories, or 50 feet in height, overhead lines shall be arranged where practicable so that a clear space (or zone) at least 6 feet wide will be left either adjacent to the buildings or beginning not over 8 feet from them, to facilitate the raising of ladders when necessary for fire fighting.

ARTICLE 4. SERVICES

401. GENERAL

a. Wires shall not be so interconnected as to form a shunt around any street fuse or switch.

b. No overhead service, no underground service from a subway, and no service from an isolated plant shall supply more than one building except under one of the following conditions:

1. In properties and buildings under single occupancy or management;

2. If the service wires are kept out of all buildings but those served;

Conductors in conduit or duct placed under 2 inches of concrete beneath a building, or buried in 2 inches of brick or concrete within a wall, are considered outside the building.

3. By special permission.

402. OVERHEAD, FROM MAIN TO BUILDING

a. Approved weatherproof or approved rubber covering shall be employed on single wires, and approved rubber covering on multiple-conductor cables. Wires shall not be smaller than No. 10 if of soft copper, or smaller than No. 12 if of medium or hard-drawn copper.

b. Wires or cables shall not approach nearer than 8 feet to buildings over which they pass, and, if attached to roofs thereof, shall be supported on substantial structures.

It is recommended that wires passing over a building be supported on structures which are independent of the building.

c. When a service from overhead supply wires to a building is carried underground, the portion of the wires underground and running up the pole to a point at least 8 feet above the ground shall be lead-covered and suitably protected from mechanical injury.

403. ON EXTERIOR OF BUILDING

a. Wires or cables which are liable to contact with awnings, swinging signs, shutters or other movable objects shall be inclosed in approved conduit made weatherproof.

b. Wires or cables exposed to the weather shall be supported on petticoat insulators placed at intervals not exceeding 15 feet, this interval being decreased if the wires are subject to disturbance; and the insulators shall be so designed or located as to hold individual wires at least 1 foot apart and at least two inches from the surface wired over; provided, however, that brackets, racks, supports or insulators especially approved for the location may be used if they separate individual wires at least 6 inches and are placed at intervals not exceeding 9 feet.

c. Multiple-conductor cables shall be kept at least 6 inches from adjacent woodwork and at least 12 inches from overhanging projections of combustible material, unless approved fittings which afford equivalent protection are used.

d. Wires not exposed to the weather may be supported on glass or porcelain knobs placed at intervals not exceeding 4½ feet and retaining the wires at least 1 inch from the surface wired over. Weatherproof or rubber covering shall be employed on conductors thus run.

404. ENTRANCE

a. All service wires shall enter the building at a point as near as practicable to the location of the service switch. They shall be rubber covered from the point of support on the outside of the building nearest the entrance to the service switch and cutout, and shall not be smaller than No. 10.

It is recommended that conductors entering buildings from overhead lines be encased in approved rigid metal conduit having weatherproof threaded joints and equipped with approved service head, and that all wires of same circuit be placed in the same conduit. (See section 503, Table 1, for number and size of conductors permitted in service conduit.)

b. The inner end of service conduit shall enter a terminal box or service switch cabinet, or be made up directly to an equivalent device enclosing all live metal parts, but need not be electrically connected to it if free from metallic contact with the ground, and, if necessary, isolated or guarded.

c. Where conduit is not used, drip loops shall be formed on the individual wires which shall then pass upward and inward through slanting non-combustible, non-absorptive, insulating tubes.

d. Where a conduit enters from an underground distribution system, the end within the building shall be sealed with suitable insulating compound so as to prevent the entrance of moisture and gases.

e. In services operating at more than 600 volts, all ungrounded conductors shall, except as provided below, be controlled and protected by an automatic overload circuit-breaker which shall be of suitable rupturing capacity and which shall be located as near as possible to the point where the service enters the building and so that the point from which it is opened or closed will be readily accessible. Each service lead shall have an air-break disconnector which will disconnect from the supply line all apparatus within the building. If the service does not supply, at the primary voltage, any equipment not contained in a fireproof transformer vault or if it enters only a detached transformer house or inclosure, then suitable disconnectors and suitable fuses may be used and may be installed in the transformer inclosure. If in such cases the voltage does not exceed 2300 volts to ground and the installed transformer capacity does not exceed 50 k.v.a. per phase, suitable fuses without disconnectors may be installed in the transformer inclosure. In all cases where automatic overload circuit-breakers are not installed in the primaries and arranged so that they may be tripped manually from a readily accessible point outside of the transformer vault or inclosure, suitable circuit-breakers or switches and suitable fuses shall be provided in the secondaries as required for low-voltage services elsewhere in this article. Air-break disconnectors and fuses shall be accessible only to qualified attendants.

405. SERVICE EQUIPMENT, WITHIN BUILDING

a. In this section the word "switch" shall be construed as including a circuit-breaker that is capable of manual operation.

b. A switchboard, panelboard, oil switch, or an approved cabinet containing a service switch, shall be placed at the nearest readily accessible point to the entrance of the service, either within the building or outside the building wall in a location protected from the weather. Outside service cabinets shall be of an approved weatherproof type.

c. A service switch shall be provided which shall indicate plainly whether it is open or closed. This switch shall be installed in one of the following ways:

1. As an air-break or oil-immersed switch inclosed in a grounded metal case;

2. As an air-break or oil-immersed switch mounted on a switchboard or panelboard which is accessible to qualified persons only.

d. The service switch shall interrupt all conductors of the circuit and disconnect all devices within the building except that

1. Where the switch, fuses and meter are combined in an approved device or compact combination of such devices having no live parts or wiring exposed, and capable of being sealed or locked, the switch may be so connected that it will not disconnect the fuses or the meter from the supply line; and the potential coils of the meter may be connected on the supply side of the service cutout;

2. Where the switch and fuses are mounted in an approved cabinet having no live parts or wiring exposed and capable of being sealed or locked, the switch blade may be omitted in any grounded conductor if other means is provided within the cabinet for disconnecting such conductor.

e. An enclosed service switch shall be externally operable unless additional switches are provided for control of individual circuits, as recommended below.

It is recommended that where the current of a single circuit, or group of circuits, is separately metered, as in apartment house installations, a switch and cutout be installed to control each such separately metered installation, the switch and cutout being enclosed and the switch being externally operable. The location of this switch and cutout may, or may not, be close to the meter.

f. A switch controlling a 3-wire direct-current or a single-phase system may be so designed that one outside conductor can be opened without opening the other.

g. A fuse or automatic overload circuit-breaker shall be placed in each ungrounded service conductor. When fuses are used they shall be controlled by the service switch except when they are located at the outer end of the service conduit or as provided in paragraph d (1) of this section.

h. No fuse or circuit breaker shall be placed in a grounded service wire except a circuit-breaker which simultaneously opens all conductors of the circuit.

i. Where not located on a switchboard, live parts of cutout bases or circuit-breakers shall be enclosed.

j. An automatic overload circuit-breaker may be used in place of both service switch and fuse and when not subject to competent supervision shall be of a type specially approved for service conditions.

k. In properties having generating plant or which are served by a master service, the wires running from building to building shall not be considered as service wires, so that fuses or circuit-breakers will not be required where these wires enter buildings, provided the fuse or circuit-breaker next back on the line properly protects the wires within the buildings.

l. Where a group of buildings is supplied from one service or generating plant, provision shall be made so that the service to any one of the buildings may be disconnected. This may be accomplished by a disconnecting switch within the building served or by a feeder switch.

406. HAZARDOUS LOCATIONS

a. Service entrance equipment shall not be located in the extra-hazardous locations described in paragraph b of section 3201 of this code. If placed where combustible dust or flyings are liable to be present in

sufficient quantities to produce an explosive or flammable mixture, such equipment shall be totally inclosed in grounded metal cabinets or cases, with provision for external control only or shall be located in a fire-resistive room provided with a self-closing door.

ARTICLE 5. WIRING METHODS

501. OPEN WIRING

a. Supports shall be composed of approved non-combustible, non-absorptive insulating material, free from checks, rough projections or sharp edges which might injure the insulation on the conductor. If the supports are designed to grip the wires, either screws or nails may be used to fasten the supports in place, but nails shall be long enough to penetrate the woodwork not less than ½ the depth of the knob and fully the thickness of the cleat. Cushion washers shall be used with nails.

b. Supports shall provide at least ¼ inch separation between the securing screw or nail and the wire, and shall be designed for two securing screws if of the split knob (or single-wire cleat) type intended for wires larger than No. 4.

c. Multiple-wire cleats shall be so designed as to separate the wires at least 2½ inches and maintain them at least ½ inch from the surface wired over. Such cleats shall not be employed to support wires operating at a potential exceeding 300 volts.

d. Knobs shall be so designed as to maintain the wire at least 1 inch from the surface wired over, and shall conform to the following minimum dimensions:

Size of Wire Inclusive	Size of Base Inches			Solid Knobs, Groove, Inches.		Split Knobs, Thickness of Cap, Inches from Top of Wire Groove
	Circular Knobs, Diameter	Square Knobs or Single Wire Cleats				
		Width	Length	Depth	Diameter	
14-10	1⅛	¾	1¾	5/16	¼	3/8
8-4	1½	7/8	2	5/16	5/16	5/8
2-00	2	1	2¼	7/16	5/8	5/8
000-300,000 C. M.	2½	1⅛	2¾	7/16	33/32	7/8
400,000-1,000,000 C. M.	3	1⅜	3¾	5/8	1¼	1

e. Tubes and bushings shall conform to the following minimum dimensions:

Diameter of Hole.	External Diameter.	Thickness of Wall.	External Diameter of Head.	Length of Head
5/16 in.	9/16 in.	1/8 in.	13/16 in.	½ in.
3/8	11/16	5/32	15/16	½
½	13/16	5/32	1 5/16	½
5/8	15/16	5/32	1 5/16	½
¾	1 5/16	5/32	1 11/16	5/8
1	1 15/16	5/32	1 11/16	5/8
1¼	1 11/16	5/32	2 5/16	5/8
1½	2 1/16	11/64	2 11/16	¾
1¾	2 5/16	11/64	3 1/16	¾
2	2 11/16	11/64	3 7/16	¾
2¼	3 1/16	11/64	3 11/16	1
2½	3 11/16	11/64	4 5/16	1

An allowance of 1/64 of an inch for variation in manufacturing will be permitted, except in the thickness of the wall.

f. Wires located in dry places shall be of approved rubber-covered (R), slow-burning weatherproof (SBW), varnished cloth insulated (VC) or slow burning (SB) type.

g. Wires located in damp places or in buildings especially subject to moisture shall be of the rubber-covered type. Wires subjected to corrosive vapors shall be of the weatherproof, varnished cloth or rubber-covered type, as may be directed by the inspection department. Where the environment is such that rapid deterioration of conductors or insulation is probable, the inspection department may require the wires to be suitably enclosed, coated or otherwise protected to better withstand the particular conditions of service.

h. Wires shall not be laid in plaster, cement or similar finish, nor fished for any great distance or where the inspector cannot satisfy himself that the rules have been complied with. Wires shall not be fastened with staples.

i. Twin wires shall not be used, except in conduit or where flexible conductors are necessary.

j. Wires of No. 8 or larger supported on solid knobs shall be securely tied thereto. If wires are used for tying, they shall have an insulation of the same type as that of the wires which they confine.

k. Wires in dry places shall be rigidly supported and for voltages not exceeding 300 volts shall be separated 2½ inches from each other and ½ inch from the surface wired over. For voltages from 301 to 600 volts the wires shall be separated 4 inches from each other and 1 inch from the surface wired over. In damp places a separation of at least 1 inch from the surface wired over shall be maintained for all voltages.

Rigid supporting requires under ordinary circumstances, when wiring over flat surfaces, supports at least every 4½ feet, this interval being shortened if the wires are liable to be disturbed.

In buildings of mill construction, mains not smaller than No. 8, where not liable to be disturbed, may be separated about 6 inches and run direct from timber to timber, being supported from each timber only.

l. Wires shall not be dead-ended at a rosette, socket or receptacle unless the last support is within 12 inches of the same.

m. Wires exposed to mechanical injury shall be suitably protected by running boards not less than ½ inch in thickness and 3 inches in width, or by guard strips not less than ⅞ inch in thickness and at least as high as the insulating supports, placed on each side of and close to the wiring.

Protection may also be secured by resorting to another method of wiring, such as approved conduit or armored cable. This is desirable when crossing floor timbers.

n. Open wiring shall not be placed in elevator shafts.

o. Vertical wires exposed to mechanical injury on side walls shall be protected by a substantial boxing, extending upward to a point not less than 7 feet above the floor, said boxing closed at the top by bushed holes through which the wires pass, and providing an air space of 1 inch about the wires. A sleeve of metal pipe may be substituted for the boxing, in which case the insulation of each wire shall be reinforced by approved flexible tubing extending from the insulating support adjacent to one end of the pipe, to the insulating support adjacent to the other end.

The Classified Building Trade Directory lists just those things used in building construction and equipment. Saves time and worry.

If alternating current is used, all wires of a circuit shall be contained in one pipe.

In damp places the wooden boxing may be preferable, because of the precautions which would be necessary to secure proper insulation if pipe were used. With this exception, however, iron pipe is considered preferable to the wooden boxing, and its use is recommended, as it is especially suitable for the protection of wires near belts, pulleys, etc.

p. Wires located in damp places shall be so placed that an air space will be permanently maintained between them and pipes which they cross.

Wires run in close proximity to water pipes or tanks are considered to be exposed to moisture. It is recommended that wires be run over, rather than under, pipes upon which moisture is likely to gather or which may leak.

q. Wires shall be separated from contact with walls, floors, timbers or partitions through which they pass by tubes or bushings composed of approved non-combustible, non-absorptive insulating material. If the bushing is shorter than the hole, a waterproof sleeve, such as an iron pipe, shall be inserted in the hole and an insulating bushing slipped into the sleeve at either end and in such a manner as to keep the wire absolutely out of contact with the sleeve.

r. Wires shall be permanently separated from adjacent metallic piping or other conducting material, or from any exposed lighting, power or signal wire which approaches within 2 inches, by a firmly fixed and continuous non-conductor, additional to the insulation on the wire. Where an insulating tube is used, it shall be secured at the ends.

Deviations from this requirement may, where necessary, be allowed by the inspection department.

s. Open wires in attics and accessible roof spaces shall be treated as though concealed and not exposed to mechanical injury unless they are run on the upper edges of joists.

502. KNOB-AND-TUBE WORK

a. Supports shall conform to the requirements for knobs, tubes and bushings, as prescribed in section 501 of this code.

b. Wires shall be of approved rubber-covered type (R).

c. Wires shall be separated at least 5 inches and maintained at least 1 inch from the surface wired over. At distributing centers, meters, outlets, switches or other places where space is limited and the 5 inch separation cannot be maintained, each wire shall be encased in a continuous length of approved flexible tubing.

It is recommended that wires be run singly on separate timbers or studding.

d. Flexible tubing shall have a smooth interior, and its outer surface shall be treated with a moisture repellant and shall not convey fire when ignited and held in a vertical position. The tubing shall be so designed that the interior lining, if there is one, cannot be removed in lengths greater than 3 feet, and the tubing shall be sufficiently tough and tenacious to withstand any abrasion likely to be encountered in service.

e. Where it is impracticable to employ insulating supports, the wires, if not exposed to moisture and if operated at a potential not exceeding 300 volts, may be fished if separately encased in approved flexible tubing extending in continuous lengths from one support to the next or to the outlet, or from one outlet to another; otherwise, approved conduit or approved armored cable shall be used.

f. Where a change is made from concealed work to conduit or armored cable, an approved terminal fitting having a separate bushed hole for each wire shall be used, through which fitting the wires shall pass without splice, joint or tap. This terminal fitting need not be accessible.

g. In installing wires the precautions as to rigid supporting, separation between wires and clearance from foreign objects, as prescribed in section 501 of this code shall be observed. Wires passing through cross timbers in plastered partitions shall be protected by an additional tube extending at least four inches above the timber.

h. Approved outlet boxes or plates shall be installed at all outlets, and the flexible tubing shall extend from the last knob into and be secured to such boxes or plates.

503. CONDUIT WORK

a. All surfaces of the conduit tube, elbows, bends and similar fittings shall be suitably protected from corrosion.

b. No conduit smaller than ½ inch, electrical trade size, shall be used; provided, however, that concealed extensions from existing branch circuit outlets in buildings of fireproof construction, may be made by means of approved flexible or rigid conduit, not smaller than 5/16 inch, or other forms of metal raceway approved for the purpose, and fittings containing one No. 14 rubber-covered wire. This conduit shall not be run in concealed spaces but may be laid on the face of the fireproofing and may be plastered over. Such extensions shall be confined to the room or suite in which they originate.

c. Finished conduit, as shipped, shall be in 10 foot lengths, with each end reamed and threaded, and shall have an interior coating of a character and appearance which will readily distinguish it from ordinary pipe commonly used for other than electrical purposes. One coupling shall be furnished with each length.

d. Elbows or bends shall be so made that the conduit will not be injured. The radius of the curve of the inner edge of any elbow shall be not less than 3½ inches.

e. Conduit shall be installed as a complete system, without the wires. It shall be continuous from outlet to outlet, or from fitting to fitting, and

shall be mechanically connected to all fittings. The entire system shall be securely fastened in position.

Ordinarily, this involves carrying service pipes and main runs into the cutout box or cabinet; but the requirement may be waived in the case of an underground service.

It is recommended that preference be given to outlet boxes and fittings having conductive coatings, in order to secure better electrical contact at all points of the conduit system.

It is recommended that for all sidewall and partition outlets in concealed work in new buildings under construction outlet boxes having a depth of approximately 1½ inches be provided.

f. A run of conduit, between outlet and outlet or between fitting and fitting, shall include not more than the equivalent of 4 quarter bends, the bends at the outlets or junction boxes not being counted.

g. Where a conduit enters a box or other fitting an approved bushing shall be provided to protect the wire from abrasion, unless the design of the box or fitting is such as to afford equivalent protection.

h. Conduit shall be grounded as prescribed in article 9 of this code, and at a point as near as practicable to the source of supply; provided, however, that this requirement shall not apply to service runs of any length or to isolated conduit runs not exceeding 25 feet, when these runs are free from metallic contact with the ground and from adjacent grounded metal and are guarded when within reach from grounded surfaces.

i. Conduit wire shall be of approved rubber-covered type, or, if in a permanently dry location, of the varnished cloth insulated type. A double braid shall be provided for conductors larger than No. 8 and for all twin, twisted or multiple-conductor cables. Slow-burning insulation may, however, be used in permanently dry and excessively hot locations by permission of the inspection department. All wires of No. 6 or larger shall be stranded. There shall be no splice or tap within the conduit proper.

j. Wires shall not be drawn in until all mechanical work on the building has been completed, as far as possible. Wires of different systems shall not occupy the same conduit.

Different systems are those which derive their supply from (1) different sources of current, (2) transformers connected to separate primary circuits, or (3) transformers having different secondary voltages.

k. When alternating current is to be employed, all conductors of a circuit shall be placed within one conduit, except as provided in paragraph b of this section.

It is recommended that this course be pursued in the case of direct current also, in order to obviate induction troubles if a change is made to alternating current at a later date.

l. Except in the case of stage pocket and border circuits and flasher and carriage call wires and elevator control wires or by permission of the inspection department, one conduit shall not contain more wires than as specified in Table 1 of this section.

m. Size of Conduits for the Installation of Wires and Cables.

The following tables apply only to complete conduit systems, and do not apply to short sections of conduit used for the protection of exposed wiring from mechanical injury.

TABLE 1. TWO-WIRE AND THREE-WIRE SYSTEMS.

Size of Wire	Number of Wires in One Conduit								
	1	2	3	4	5	6	7	8	9
	Minimum Size of Conduit in Inches								
14	½	½	½	¾	¾	1	1	1	1
12	½	½	¾	¾	¾	1	1	1	1¼
10	½	¾	¾	1	1	1	1¼	1¼	1¼
8	½	¾	1	1	1	1¼	1¼	1¼	1¼
6	½	1	1¼	1¼	1½	1½	2	2	2
5	¾	1¼	1¼	1¼	1½	2	2	2	2
4	¾	1¼	1¼	1½	2	2	2	2	2½
3	¾	1¼	1¼	1½	2	2	2	2½	2½
2	¾	1¼	1½	1½	2	2	2½	2½	2½
1	¾	1½	1½	2	2	2½	2½	3	3
0	1	1½	2	2	2½	2½	3	3	3
00	1	2	2	2½	2½	3	3	3	3½
000	1	2	2	2½	3	3	3	3½	3½
0000	1¼	2	2½	2½	3	3	3½	3½	4
200000 C. M.	1¼	2	2½	2½	3	3	3½	3½	4
225000	1¼	2½	2½	3	3	3½			
250000	1¼	2½	2½	3	3	3½			
300000	1¼	2½	3	3	3½	3½			
350000	1¼	2½	3	3½	3½	4			
400000	1¼	3	3	3½	4	4			
450000	1½	3	3	3½	4	4½			
500000	1½	3	3	3½	4	4½			
550000	1½	3	3½	4	4½	5			
600000	2	3	3½	4	4½	5			
650000	2	3½	3½	4					
700000	2	3½	3½	4½					
750000	2	3½	3½	4½					
800000	2	3½	4	4½					
850000	2	3½	4	4½					
900000	2	3½	4	4½					
950000	2	4	4	5					
1000000	2	4	4	5					
1100000	2½	4	4½	6					
1200000	2½	4½	4½	6					
1250000	2½	4½	4½	6					
1300000	2½	4½	5	6					
1400000	2½	4½	5	6					
1500000	2½	4½	5	6					
1600000	2½	5	5	6					
1700000	3	5	5	6					
1750000	3	5	5	6					
1800000	3	5	6	6					
1900000	3	5	6						
2000000	3	5	6						

Where single conductor, single braid, solid wires only are used, four No. 14 wires may be installed in a ½-inch conduit and up to seven No. 14 wires in a ¾ inch conduit. Three No. 12 wires may be installed in a ½-inch conduit, four No. 10 wires in a ¾-inch conduit and three No. 8 wires in a ¾-inch conduit.

TABLE 2. THREE-CONDUCTOR CONVERTIBLE SYSTEM.

Size of Wires				Size Conduit Electrical Trade Size
two	14	and one	10	¾ inch
"	12	"	8	¾ "
"	10	"	6	1 "
"	8	"	4	1 "
"	6	"	2	1¼ "
"	5	"	1	1¼ "
"	4	"	0	1½ "
"	3	"	00	1½ "
"	2	"	000	1½ "
"	1	"	0000	2 "
"	0	"	250000	2 "
"	00	"	350000	2½ "
"	000	"	400000	2½ "
"	0000	"	550000	3 "
"	250000	"	600000	3 "
"	300000	"	800000	3 "
"	400000	"	1000000	3½ "
"	500000	"	1250000	4 "
"	600000	"	1500000	4 "
"	700000	"	1750000	4½ "
"	800000	"	2000000	4½ "

TABLE 3. STAGE POCKET AND BORDER CIRCUITS, AND ELSEWHERE BY SPECIAL PERMISSION.

Size of Wire	Maximum Number of Wires in Conduit					
	Inch 1	Inch 1¼	Inch 1½	Inch 2	Inch 2½	Inch 3
14	11	19	26	43	61	95
12		15	21	34	50	77
10		12	16	27	38	60
8			13	22	31	49
6					14	22

For groups or combinations not included in the above tables, consult the inspection department. For such groups or combinations, it is recommended that the conduit be of such size, that the sum of the cross-sectional areas of the several conductors will not be more than 40 per cent. of the interior cross-sectional area of the conduit.

n. Wires in vertical conduits shall be supported at the following intervals:

No. 14	to No. 0	not	greater	than	100	feet.
No. 00	" No. 0000	"	"	"	80	"
No. 0000	" 350000 C. M.	"	"	"	60	"
350001 C. M.	" 500000 C. M.	"	"	"	50	"
500001 C. M.	" 750000 C. M.	"	"	"	40	"
above	750000 C. M.	"	"	"	35	"

The following methods of supporting cables are recommended:

1. By approved clamping devices constructed of or employing insulating wedges inserted in the ends of the conduits.

2. By inserting junction boxes at the required intervals in which insulating supports of approved type are installed and secured in a satisfactory manner to withstand the weight of the conductors attached thereto, the boxes being provided with covers.

3. In approved junction boxes, by deflecting the cables not less than 90 degrees and carrying them horizontally to a distance not less than twice the diameter of the cable, the cables being carried on two or more insulating supports, and additionally secured thereto by tie wires if desired.

o. Vertical wires of No. 2 or larger, shall not be deflected where they enter or leave a cabinet; provided, however, that wires of No. 2 to 250000 C. M. inclusive, if brought into a cabinet or box opposite the panel lugs in which they terminate, may be deflected sufficiently to permit their attachment to these lugs, if the gutter of the cabinet is not less than 4 inches in width.

504. OTHER WIRE RACEWAYS

a. Raceways shall be used only in exposed dry locations and where the maximum difference of potential between wires therein does not exceed 300 volts. They shall not be placed in elevator shafts.

b. Wooden raceways shall be coated, externally and internally, with 2 layers of waterproofing, or shall be impregnated with a moisture repellant. The raceway shall be composed of two parts, a backing and a capping, and shall afford suitable protection against abrasion of wires. It shall be so constructed as to thoroughly encase the wire, having a barrier of not less than ½ inch in thickness between wires, and having exterior walls which under grooves shall be not less than ⅜ inch in thickness and on sides not less than ¼ inch in thickness.

It is recommended that only hardwood be used.

c. Metal raceways shall be of such construction as will distinguish them from metal conduit. All surfaces of raceway, elbows, bends and similar fittings shall be suitably protected from corrosion.

d. Metal raceways and their elbows, couplings and similar fittings shall be so designed that the sections can be electrically and mechanically coupled together, while protecting the wires from abrasion. Holes for screws or bolts inside the raceway shall be so designed that when screws or bolts are in place their heads will be flush with the metal surface.

e. Wires shall be of approved rubber-covered type, and shall be continuous from outlet to outlet, or from fitting to fitting, no joints or taps being located in the raceway proper.

f. Not more than 4 No. 14 wires, nor any circuit protected by fuses larger than 20 amperes at 125 volts or 10 amperes at 250 volts, shall be placed in any metal raceway.

g. Where alternating current is to be employed in connection with metal raceway work, all wires of a circuit shall be placed in one raceway.

It is recommended that this course be pursued in the case of direct current also, in order to obviate induction troubles if a change is made to alternating current at some later date.

h. Metal raceway shall be continuous from outlet to outlet, or from approved fitting to approved fitting. It may be extended through dry walls or dry partitions if in unbroken lengths where passing through; but, where the wall or partition is damp, or where the raceway passes through a floor, an iron pipe sleeve shall be placed over the raceway and shall extend clear of either side of the wall or partition, or from the ceiling below to a point at least 3 inches above the flooring. Where protection from mechanical injury is necessary, the iron pipe sleeve shall extend to a point at least 5 feet above the flooring.

i. Metal raceways shall be grounded as prescribed in article 9 of this code, and at a point as near as practicable to the source of supply; provided, however, that this requirement shall not apply to isolated raceway runs not exceeding 25 feet, when these runs are free from metallic contact with the ground and from adjacent grounded metal and are guarded when within reach from grounded surfaces.

j. When combination metal raceways are used both for signal and for lighting and power circuits, the different systems shall be run in separate compartments and the same relative position of compartment shall be maintained throughout the premises, in which case the provisions of paragraph j, section 503, and of paragraphs a to d inclusive, section 6003, of this code, shall be considered as having been observed. When such combination metal raceways are used, ten No. 14 wires shall be permitted in the compartment for light, heat and power circuits. In all other respects, the provisions of this section covering single compartment raceways, shall apply.

505. ARMORED CABLE

a. Wires of armored cables shall be of rubber-covered type. The armored cable shall carry a distinctive marker throughout its entire length.

b. Where alternating current is to be employed, all conductors of a circuit shall be contained within one armor; provided, however, that concealed extensions from branch circuit outlets in buildings of fireproof construction may be made by means of single, double or triple conductor armored cable with suitable fittings at outlets. This cable shall not be run in concealed spaces but may be laid on the face of the fireproofing and may be plastered over. Such extensions shall be confined to the room or suite in which they originate.

It is recommended that in the case of direct current also all conductors of a circuit be placed within one armor, in order to obviate induction troubles if a change is made to alternating current at a later date.

c. Cable shall be continuous from outlet to outlet, or from fitting to fitting, and the armor shall be mechanically connected to all fittings, the entire cable system being securely fastened in place.

Ordinarily, this involves carrying service cables and house cables into the cutout box or cabinet, but the requirement may be waived in the case of an underground service.

It is recommended that for all sidewall and partition outlets in concealed work in new buildings under construction, outlet boxes having a depth of approximately 1½ inches be provided.

d. A lead sheath shall be interposed between the outer braid and the steel armor where cable is installed in so-called fireproof buildings in course of construction or in such buildings when completed if the cable will be exposed to moisture, or where the cable is exposed to the weather, or in breweries, stables or other damp places; provided, however, that the lead sheath shall not be required if the cable is laid against a brick wall or laid within an ordinary plaster wall, unless these walls are continuously damp.

e. All bends shall be so made that the armor of the cable will not be injured, and the radius of the curve of the inner edge of any bend shall not be less than 1½ inches.

f. The armor shall be grounded as prescribed in article 9 of this code, and at a point as near as practicable to the source of supply; provided,

however, that this requirement shall not apply to service runs of any length or to isolated cable runs not exceeding 25 feet, when these runs are free from metallic contact with the ground and from adjacent grounded metal and are guarded when within reach from grounded surfaces.

506. DECORATIVE LIGHTING SYSTEMS

a. Temporary installations of approved systems of decorative lighting shall be used only when permission therefor has been granted by the inspection department and where the difference of potential between the wires of any circuit does not exceed 150 volts and where the number of outlets and lamps connected to them is in no case such as to place more than 15 amperes on a branch circuit fuse.

507. INSULATION RESISTANCE

a. A completed installation shall have a resistance between conductors, and between all conductors and ground, not less than:

Up to	5	amperes	4,000,000	ohms
" "	10	"	2,000,000	"
" "	25	"	800,000	"
" "	50	"	400,000	"
" "	100	"	200,000	"
" "	200	"	100,000	"
" "	400	"	50,000	"
" "	800	"	25,000	"
" "	1,600	"	12,000	"

b. The above values shall be determined with all cutouts and safety devices in place. If lamp sockets, receptacles, fixtures and other appliances are also connected, the minimum resistance required shall be one-half that specified in the table.

ARTICLE 6. CONDUCTORS

601. CLASSIFICATION AND CONSTRUCTION

a. Wires, cables and cords of all kinds except weatherproof wire shall have a distinctive marking the entire length of the coil so that they may be readily identified in the field. All wires, cables and cords shall also be plainly tagged or marked as follows:

1. The maximum working pressure or voltage for which the wire was tested or approved. This may be omitted for slow-burning, slow-burning weatherproof and weatherproof wires.

2. The words "National Electrical Code Standard."

3. Name of the manufacturing company and, if desired, trade name of the wire.

4. Month and year when manufactured. This may be omitted for slow-burning, slow-burning weatherproof and weatherproof wires.

5. The proper type letter for the particular style of wire or cable as given in the following sections for each type of insulation.

b. Conductors, whether solid or stranded, shall not be of smaller size than No. 14 except as allowed for fixture work and for flexible cords.

602. RUBBER-COVERED WIRE

For installation rules, see article 5 of this code.

a. Classification.

R.....	Rubber-covered for voltages	0—600
R15.....	Rubber-covered for max. voltage	1500
R25.....	" " " " "	2500
R35.....	" " " " "	3500
R50.....	" " " " "	5000
R70.....	" " " " "	7000
RL.....	Rubber-covered, leaded.	
AC.....	Wires for use in armored cable.	
ACL.....	Leaded wires for use in armored cable.	

b. All National Electrical Code Standard rubber-covered wires shall be examined and tested at the factory and shall be labeled before shipment.

c. All conductors and the individual wires of stranded conductors shall be tinned.

d. Conductors shall be insulated for their entire length with a properly applied and properly vulcanized rubber compound. The insulation shall be of the nominal thickness given in the following table, the requirements of which vary according to the sizes of conductors and the maximum working pressure.

Table of Thicknesses of Rubber Insulation for Rubber-covered Wires and Cables in 64th Inches

Size of Conductor		Type	R	R-15	R-25	R-35	R-50	R-70
American or B. & S. Gauge	Standardized Stranding	For Working Pressures Not Over	600 Volts	1500 Volts	2500 Volts	3500 Volts	5000 Volts	7000 Volts
14 to 8	7/25 to 7/51		3	6	8	10	12	16
7 to 2	7/64 to 7/102		4	7	9	10	12	16
1 to 0000	19/64 to 19/107		5	8	10	10	12	16
C. M. 225,000 to 500,000	19/114 to 37/116		6	9	10	11	12	16
525,000 to 1,000,000	61/102 to 61/128		7	10	10	12	12	16
Over 1,000,000	91/114 to 91/128		8	10	10	12	14	18

The second column above refers to wires and cables having standardized stranding as given in Table II of section 610. The first column refers to solid conductors and to wires and cables stranded otherwise than in Table II.

e. All single conductor rubber-covered wires and cables shall have a covering of fibrous material applied directly to the surface of the insulating wall. For any single conductor wire there shall be at least one braid for sizes from No. 14 to and including No. 8. For all single-conductor cables larger than No. 8 there shall be at least two braids or a tape and a braid. For twin wires and twisted pair wires and for all multiple conductor cables there shall be a fibrous covering on each individual wire and in addition a braid enclosing the bunched conductors. For certain special service conditions, one or more additional coverings of

fibrous material or of lead may be required. Fibrous coverings may be either braid or tape, but tape shall not be used for the final outer covering. All braids shall be impregnated with a moisture-proof compound.

f. Lead coverings may be applied to single or multiple conductors. Lead-covered multiple conductor cable with more than two conductors shall, in all cases, have the conductors helically laid. In all cases, the individual conductors of lead-covered cable shall have a fibrous covering and, except for two conductor cables with conductors parallel, there shall be a fibrous covering over bunched conductors.

g. For conductor sizes No. 8 and smaller the neutral conductor on all 3-wire circuits and one conductor on all 2-wire circuits shall have a continuous identifying marker readily distinguishing it from the other conductors. For rubber-covered wire the identification shall consist of a white or natural gray covering. When one of the circuit wires is to be grounded, the ground connection shall be made to this identified wire.

603. FLEXIBLE CORDS

a. All National Electrical Code Standard rubber-covered flexible cords shall be examined and tested at the factory and shall be labeled before shipment.

b. Each conductor shall have a carrying capacity not less than that of a No. 18 wire.

c. The insulation, except for heater cord (Type H), shall consist of a properly applied and properly vulcanized rubber compound of the nominal thickness given in the following table:

Gauge	Thickness, Inches
18 and 16	1/32
14 to 8	3/64

Exceptions: For Types PO, P and PWP with conductors of No. 18 gauge, the rubber insulation may be 1/64 inch in thickness. When Type PO cord has 1/64 inch insulation its use shall be confined to portable lamp fixtures.

When used where the voltage between any two conductors or from any conductor to the ground is over 300 volts, the insulation on flexible cords shall be at least 3/64 inch in thickness for all conductor sizes No. 8 or less, except where Type S cord is used.

d. Each conductor shall, except for heater cord and hard-service cord, be covered with a tight, close wind of fine cotton, or some other method shall be employed to prevent a broken strand puncturing the insulation. Cords of the several types shall conform to the descriptions given in sub-paragraphs 1-11 inclusive and the table following paragraph f of this section:

1. (Type C.) For general use as pendants in dry places; as portables for use where not exposed to hard usage.

2. (Type CB and CC.) These cords should hang free in air.

3. (Type P.) For No. 18 conductors, rubber insulation on this type of cord may be 1/64 inch in thickness.

4. (Type PD and PO.) These cords are for use only in offices, dwellings and similar places where not liable to hard usage. When

Type PO cord has 1/64 inch insulation its use shall be confined to portable lamp fixtures.

5. For Type PD the conductors are twisted together; for Type PO the conductors are laid parallel under the outer braid.

6. (Type PWP.) For No. 18 conductors, rubber insulation on this type of cord may be 1/64 inch in thickness.

7. (Type E.) For elevator lighting this cord consists of conductors not smaller than No. 14 and for elevator control of conductors not smaller than No. 16.

8. (Type SJ.) For general use, pendant or portable, in wet or dry locations.

9. (Type S.) For general use, pendant or portable, in wet or dry locations, and where extra hard service conditions exist, including theatre stages, elevator lighting and control cables and garages.

10. (Type SJ and S.) The rubber compounds for the insulation and jacket on these cords is of superior quality.

11. (Type H.) For Portable Heating Apparatus: This cord is for use with all smoothing and sad-irons and with other heating devices requiring over 250 watts. The covering may consist of a layer of rubber or other approved material, a covering of asbestos and an outer braid enclosing either all the conductors as a whole, or each conductor separately.

e. Other types of coverings shall be submitted for special examination and shall be approved before being used.

f. When polarity marking of flexible cords is provided, one conductor shall have a continuous identifying marker readily distinguishing it from the other conductors. This marker shall be a tracer in the braid of any color contrasting with that of the braid, or, in the case of cords having no braids the insulation of one conductor shall be of a color readily distinguishing it from the other conductors.

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Use	Type	Trade Name	Braid on Each Conductor	Reinforcement or Filler	Outer Cover
As Pendants or Portables in Dry Places					
Where not Subject to Hard Usage	C PD PO SJ	Lamp Cord Twisted Portable Parallel Cord Type SJ	Cotton or Silk " " " " " " No Braids	 Spec. Rub. Jkt.	Cotton or Silk " " " No Outer Braid
For Hard Usage	P S CA PA	Reinforced Cord Hard Service Cord Armored Cord Armor. Reinf. Cord	Cotton or Silk No Braids Cotton or Silk " " "	Rubber Jacket Spec. Rub. Jkt. Rubber Jacket	Cotton or Silk No Outer Braid Armor Cotton and Armor
Pendants Damp Places	CB CC S SJ	Brewery Cord Canvasite Cord Hard Service Cord Type SJ	Cotton Wp. " " No Braids		Cotton Wp. No Outer Braid " " "
Portable Damp Places	PWp PkWp PAWp S SJ	Reinforced Cord Wp. Packinghouse Cord Armored Reinf. Cord Wp. Hard Service Cord Type SJ	Cotton " " No Braids " "	Rubber Jacket Filler Rubber Jacket	Cotton Wp. 2 Cotton both Wp. Cotton Wp. and Armor No Outer Braid " " "
Theatre Stages	T S	Stage Cable See Type S above	Cotton Wp.	Filler	2 Cotton both Wp.
Theatre Borders	B	Border Light Cable	Cotton Wp.		2 Cotton both Wp.
Elevator Lighting and Control	E S	Elevator Cable See Type S above	Cotton	Rubber Jacket and or	1 or more Cotton both Wp. 3 Cotton, outer one Wp.
Portable Heaters	H	Heater Cord			

(See also further descriptions subparagraphs 1-11 incl. of paragraph d, above.)

Both Bell and Keystone telephone numbers make the Classified Building Trade Directory of still greater service.

604. FIXTURE WIRE. TYPES F-32 AND F-64.

For construction and installation of fixtures, see article 14.

a. Fixtures shall be wired with approved flexible cord or approved rubber-covered wire; provided, however, that in wiring fixtures where the insulation will be subjected to temperatures in excess of 120 degrees F. (49 degrees C.), wires having approved slow-burning or other heat-resisting coverings shall be used.

b. All National Electrical Code rubber-covered fixture wire shall be examined and tested at the factory and shall be labeled before shipment.

c. The conductors of fixture wires may be either solid or stranded but shall not be smaller than No. 18 gage. If stranded conductor is used, each conductor shall be covered with a tight close wind of fine cotton or some other method shall be used to prevent a broken strand puncturing the insulation. Solid conductors shall be tinned.

d. The insulation shall consist of properly applied and properly vulcanized rubber compound. The thickness of insulation shall be not less than 1/64 inch for No. 18 wire and not less than 1/32 inch for No. 16.

e. Coverings shall be of braided cotton or silk or of other approved material and shall be sufficiently tenacious to withstand abrasion when being pulled into fixtures.

605. ARMORED CABLES AND CORD. TYPES AC, CA, PA AND PAWP.

For installation of armored cable, see section 505.

a. The conductors shall comply with the requirements for rubber-covered wires or cords of the specified types and construction.

b. The cable or cord shall have a distinctive marker its entire length.

606. VARNISHED CLOTH INSULATED WIRE. TYPE VC.

For installation, see article 5.

a. This insulation shall not be used where exposed to moisture.

b. The insulation shall consist of layers of varnished cotton cloth applied and filled as may be specified, and shall have coverings conforming to the requirements for rubber-covered wire as prescribed in section 602 of this code.

c. The thickness of the insulation shall be not less than that prescribed in section 602 of this code for the rubber insulation of rubber-covered wire of the same conductor size and voltage.

d. No individual conductor, whether solid or stranded, shall be less than No. 14 gage. Conductors may be either plain or tinned.

The use of varnished cloth insulation is not recommended under ordinary conditions in conductor sizes smaller than No. 6, but smaller sizes may be used for leads on motors, generators, oil-filled transformers, autotransformer starters, oil switches and other apparatus where oil may come in contact with the insulation and when such leads are furnished as part of the device. In other cases varnished cloth insulated wires smaller than No. 6 may be used only by permission of the inspection department.

e. The following tests shall be applied to varnished cloth insulated wires:

1. On the wire as a whole: voltage test, insulation resistance test.
2. On test specimens: Heating test, dielectric strength.

607. SLOW-BURNING WEATHERPROOF WIRE. TYPE SBW.

For installation, see article 5. This wire is not as burnable as weatherproof, nor as subject to softening under heat. It is not suitable for outside work.

a. The insulation shall consist of two coatings, one to be fireproof and the other weatherproof. The fireproof coating shall be on the outside and shall comprise about six-tenths of the total thickness of the wall.

b. The thickness of the completed covering shall be not less than that prescribed in section 602 of this code for rubber insulation of 0-600 volt rubber-covered wires.

608. SLOW-BURNING WIRE. TYPE SB.

For installation, see article 5. This insulation is especially useful in hot, dry places where ordinary insulations would perish, and where wires are bunched, as on the back of a large switchboard or in a wire tower, so that the accumulations of rubber insulations would result in an objectionable large mass of highly inflammable material.

a. Slow-burning conductors especially designed and approved for use in fixtures as prescribed in section 604 of this code need not necessarily comply with the requirements of paragraphs b and c of this section.

b. The insulation shall consist of three braids of cotton or other thread, all the interstices of which shall be filled with material having fire-resisting and insulating properties. Its surface shall be finished smooth and hard.

c. The thickness of the completed covering shall be not less than that prescribed in section 602 of this code for the rubber insulation of 0-600 volt rubber-covered wires.

609. WEATHERPROOF WIRE. TYPE WP.

For installation, see article 5. This wire is for use outdoors, where moisture is certain, and where fireproof qualities are not necessary.

a. The insulating covering shall consist of at least three braids, all of which shall be thoroughly saturated with a dense moistureproof compound. The thickness of the completed covering shall be not less than that prescribed in section 602 of this code for the rubber insulation of 0-600 volt rubber-covered wires.

610. CARRYING CAPACITIES OF CONDUCTORS.

a. The following tables, giving the allowable carrying capacities of copper wires and cables of 98 per cent. conductivity, according to the standard adopted by the American Institute of Electrical Engineers, shall be followed in placing interior conductors.

b. For insulated aluminum wire the allowable carrying capacities shall be taken as 84 per cent. of those given in the table for the respective sizes of copper wire with the same kind of insulation.

c. Conductors of sizes Nos. 18 and 16 shall be used only for flexible cords and for fixture wires.

d. Conductors may be placed in multiple only by permission of the inspection department.

e. Varnished cloth insulated wires smaller than No. 6 shall be used only by permission of the inspection department.

TABLE I. ALLOWABLE CARRYING CAPACITIES OF WIRES.

B. & S. Gauge	Diameter of Solid Wires in Mils	Area in Circular Mils	Table A Rubber Insulation Amperes	Table B Varnished Cloth Insulation, Amperes	Table C Other Insulation Amperes
18	40.3	1,624	3		5
16	50.8	2,583	6		10
14	64.1	4,107	15	18	20
12	80.8	6,530	20	25	25
10	101.9	10,380	25	30	30
8	128.5	16,510	35	40	50
6	162.0	26,250	50	60	70
5	181.9	33,100	55	65	80
4	204.3	41,740	70	85	90
3	229.4	52,630	80	95	100
2	257.6	66,370	90	110	125
1	289.3	83,690	100	120	150
0	325.	105,500	125	150	200
00	364.8	133,100	150	180	225
000	409.6	167,800	175	210	275
		200,000	200	240	300
0000	460.	211,600	225	270	325
		250,000	250	300	350
		300,000	275	330	400
		350,000	300	360	450
		400,000	325	390	500
		500,000	400	480	600
		600,000	450	540	680
		700,000	500	600	760
		800,000	550	660	840
		900,000	600	720	920
		1,000,000	650	780	1,000
		1,100,000	690	830	1,080
		1,200,000	730	880	1,150
		1,300,000	770	920	1,220
		1,400,000	810	970	1,290
		1,500,000	850	1,020	1,360
		1,600,000	890	1,070	1,430
		1,700,000	930	1,120	1,490
		1,800,000	970	1,160	1,550
		1,900,000	1,010	1,210	1,610
		2,000,000	1,050	1,260	1,670

1 Mil=0.001 inch

TABLE II. STANDARDIZED STRANDING.

Strands			Cable		Allowable Carrying Capacities in Amperes		
No. of Strands	Mils Dia.	B. & S. Gauge No.	Area in Cir. Mils	Outside Dia. Over Copper	Table A Rubber Insulation	Table B Varnished Cloth Insulation	Table C Other Insulation
7/ 25		22	4,490	.075	15	18	20
7/ 32		20	7,150	.096	20	25	25
7/ 40		18	11,370	.120	25	30	35
7/ 51		16	18,080	.153	35	40	50
7/ 64		14	28,740	.192	50	60	70
7/ 81		12	45,710	.253	70	85	90
7/ 91		11	58,000	.273	80	95	110
7/102		10	72,680	.306	90	110	130
19/ 64		14	78,030	.320	100	120	150
19/ 72		13	98,380	.360	125	150	175
19/ 81		12	124,900	.405	150	180	210
19/ 91		11	157,300	.455	175	210	250
19/107		*	217,500	.540	225	270	325
19/114		9	248,700	.570	250	300	350
37/ 91		11	306,400	.637	275	330	400
37/ 97		*	347,500	.679	300	360	450
37/102		10	381,200	.714	325	390	500
37/116		*	484,300	.798	400	480	600
61/102		10	633,300	.918	475	565	700
61/107		*	698,000	.963	500	600	750
61/114		9	798,300	1.030	550	660	825
61/121		*	893,100	1.090	600	720	900
61/128		8	1,007,000	1.150	650	780	1000
91/114		9	1,191,000	1.250	725	870	1125
91/128		8	1,502,000	1.410	850	1020	1350
127/114		9	1,660,000	1.480	900	1100	1460
127/128		8	2,097,000	1.660	1100	1300	1700

* These individual strands are odd sizes not listed in the American or B. & S. Wire Tables

611. GENERAL REQUIREMENTS FOR USE OF CONDUCTORS

a. This article shall apply to wires, cables and cords generally, but the requirements of the other articles of this code shall be complied with as to the selection of conductors and the method of their installation and use in particular locations and classes of work.

b. No wires of size smaller than No. 14 shall be used except as permitted for fixture work and for flexible cords.

c. All splices and joints in conductors shall be made both mechanically and electrically secure without solder. The joints shall then be soldered unless made with some form of approved splicing device. All joints shall be covered with an insulation equal to that on the conductors.

d. Stranded wires, except in flexible cords, shall be soldered before being fastened under clamps or binding screws and, whether stranded or solid, when they have a conductivity greater than that of No. 8 shall be soldered into lugs for all terminal connections, except where an approved solderless terminal connector is used.

e. Wires shall be separated from contact with walls, floors, timbers or partitions through which they may pass by non-combustible non-absorptive insulating tubes, such as glass or porcelain, except at outlets where approved flexible tubing is required.

f. The bushings used shall be long enough to bush the entire length of the hole in one continuous piece, or else the hole shall first be bushed by a continuous waterproof tube. This tube may be a conductor, such as iron pipe, but in that case an insulating bushing shall be pushed into each

end of it, extending far enough to keep the wire absolutely out of contact with the pipe.

g. Where not enclosed in approved conduit, raceways or armored cable, and where liable to come in contact with gas, water, or other metallic piping or other conducting material, wire shall be separated therefrom by some continuous and firmly fixed non-conductor creating a permanent separation.

h. In wet places wires shall be so placed that an air space will be left between conductors and pipes in crossing, and the former shall be run in such a way that they cannot come in contact with the pipe accidentally.

It is recommended that wires be run over, rather than under, pipes upon which moisture is likely to gather or which, by leaking, might cause trouble on a circuit.

i. Wires for electric light or power circuits shall not come nearer than 2 inches to any other unenclosed electric light, power or signal wire without being permanently separated therefrom by some continuous and firmly fixed non-conductor. The non-conductor used as a separator shall be in addition to the regular insulation on the wire. Where tubes are used, they shall be securely fastened at the ends to prevent movement along the wire. Departure from the requirements of paragraphs g, h and i of this section may be permitted, where necessary, by the inspection department.

j. Where exposed to mechanical injury wires shall be suitably protected.

k. When crossing floor timbers in cellars or rooms where they might be exposed to injury, wires shall be installed in approved conduit or armored cable or be otherwise properly guarded. Where running boards are acceptable, they shall be not less than ½ inch in thickness and not less than 3 inches in width; where guard strips are acceptable they shall be not less than ⅞ inch in thickness and at least as high as the insulator, and shall be placed on each side of and close to the wires.

l. Protection on side walls shall extend not less than 7 feet from the floor and shall consist of substantial boxing, retaining an air space of 1 inch around the conductors, closed at the top, the wires passing through bushed holes; or approved metal conduit or pipe of equivalent strength may be used.

m. When metal pipe is used in short runs to protect wires the insulation of each wire shall be reinforced by approved flexible tubing extending from the insulator next beyond the pipe at one end to the insulator next beyond the pipe at the other end. The two or more wires of a circuit, each with its flexible tubing, if carrying alternating currents shall, or if direct current may, be placed within the same pipe.

In damp places the wooden boxing may be preferable because of the precautions which would be necessary to secure proper insulation if the pipe were used. With this exception, however, iron piping is considered preferable to the wooden boxing, and its use is recommended. It is especially suitable for the protection of wires near belts, pulleys, etc.

n. When run in unfinished attics, or roof spaces wires shall be considered to be concealed, and when run in close proximity to water tanks or pipes, wires shall be considered to be exposed to moisture. In unfinished attics or roof spaces, wires shall be considered to be exposed to mechanical injury, and shall not be run on knobs on upper edges of joists, except that in inaccessible roof spaces where wires are run across joists, they may be supported on knobs on the upper edge of each joist.

o. Wires shall not be laid in plaster, cement or similar material.

p. Wires shall not be fastened by staples.

q. Wires shall not be fished for any great distance, nor where the inspector cannot satisfy himself that the requirements of this code have been complied with.

r. Twin wires shall be used only in conduits, or where flexible conductors are necessary.

s. In 3-wire (not three-phase) systems, the neutral shall be of sufficient capacity to carry the maximum current to which it may be subjected.

t. When one of the circuit wires is to be grounded, the circuit shall be so arranged that the grounded conductor is the one identified as prescribed in section 602e of this code.

u. In alternating current systems in conduit, armored cable and metal raceways, the two or more wires of a circuit shall be placed in the same conduit, armor or raceway.

It is recommended that this course be pursued in the case of direct current also, in order to obviate the induction troubles if a change is made to alternating current at some later date.

v. The wiring in any building or group of buildings, including the service connections thereto, shall be so arranged as not to serve as a shunt around any street fuse or switch.

w. Conductors in raceways or on insulators shall not be installed in elevator shafts.

612. SPECIAL REQUIREMENTS FOR USE OF FLEXIBLE CORDS

a. When used where the voltage between any two conductors or from any conductor to the ground is over 300 volts, the insulation on flexible cords shall be at least 3/64 inch in thickness for all conductor sizes No. 8 or less, except where Type "S" cord is used.

b. Flexible cord shall be used only for pendants, wiring of fixtures, portable lamps or motors, portable heating apparatus or other portable devices.

c. For all portable work, including those pendants which are liable to be moved about sufficiently to come in contact with surrounding objects, flexible wires and cables especially designed to withstand this severe service shall be used; provided, however, that for portable lamps or other devices which are not liable to be moved about sufficiently to cause abrasion of the insulation, approved flexible cord of Type C may be used.

d. When necessary to prevent portable lamps from coming into contact with inflammable materials, or to protect them from breakage, their flexible cord leads shall be equipped with handle, socket and substantial guard, the guard being securely attached to socket or handle.

e. Unless provided with approved metal armor, flexible cords shall not be used in show windows or in show cases, except that approved portable cord may be used for the purpose of supplying current to portable lamps and other devices for exhibition purposes, and flexible cord may be used for chain fixtures.

f. Flexible cords shall be protected by approved insulating bushings where they enter sockets.

g. Flexible cords shall be so connected to all fittings that the strain will be taken from the joints and binding screws.

h. Flexible cords shall, where passing through covers of outlet boxes, be protected by approved bushings especially designed for this purpose; or the cover shall be provided with a smooth, well-rounded surface on which the cord will bear. So-called hard rubber or composition bushings shall not be used.

613. SPECIAL REQUIREMENTS FOR USE OF CONDUCTORS IN CENTRAL AND SUB-STATIONS; INCLUDING MOTOR, TRANSFORMER AND STORAGE BATTERY ROOMS, ETC.

a. Wires shall be exposed to view and supported on approved non-combustible, non-absorptive insulators or, except in storage battery rooms, may be placed in approved metal conduit, tile or other fireproof ducts. Conductors installed in conduit or ducts where exposed to moisture shall be lead sheathed and the sheathing shall be grounded. Except for low potential systems the insulation of the several conductors where leaving the metal sheath of cables shall be thoroughly protected from moisture and mechanical injury by means of a pothead or some equivalent method.

See also articles 18 and 50.

b. Wires not in conduit shall be kept so rigidly in place that they cannot come in contact. Where they pass through floors or fire walls they shall be carried through individual openings in non-combustible, non-absorptive insulating tubes or their equivalent and not through a common open space.

c. Where conductors are closely grouped as on switchboards, in wire towers, cableways, etc., the conductors shall each have a substantial flameproof outer covering. Flameproofing shall be stripped back on all conductors a sufficient distance from the terminals to give the necessary insulation for the voltage of the circuit on which the conductor is used.

ARTICLE 7. OUTLET BOXES AND CABINETS

701. OUTLET FITTINGS

a. Outlet boxes and plates, switch, junction and pull boxes and metal cabinets shall be well galvanized, enameled or otherwise properly coated, inside and out, to prevent oxidation; provided, however, that hardwood may be used for cabinets, housing devices of electric railway systems, or of open or concealed work, or wooden raceway.

It is recommended that the protective coating be of conductive material such as tin or zinc, in order to secure better electrical contact.

b. Unused openings in outlet fittings or cabinets shall be effectively closed by metal plugs or plates, affording protection substantially equivalent to that of the wall of the fitting.

c. Openings in outlet fittings or cabinets shall be equipped, either separately or as a part of the fitting, with couplings or bushings which will serve to secure the conduit, raceway or armored cable to the fitting and at the same time protect the wires from abrasion. Where a hardwood cabinet is used with open work or knob and tube work, each opening shall be equipped with a non-combustible, non-absorptive insulating bushing which shall fit securely in the opening and be so closed by the wire and tape, if necessary, as to be dust-tight. In dry places approved flexible tubing may be employed as an insulating bushing if it extends from the last insulating support and is firmly secured in place.

d. Covers of outlet fittings through which flexible cords or duplex wire pendants pass shall be provided with approved bushings, or shall have smooth, well rounded holes upon which the cord or wire may bear.

Where wires, other than flexible cord or duplex wire, pass through a metal cover, there shall be provided a separate hole for each wire, said hole being equipped with a non-combustible, non-absorptive insulating bushing.

e. Outlet fittings, and junction or pull boxes not over 150 cubic inches in size, shall be composed of pressed steel not less than 0.078 inch, No. 14 U. S. sheet metal gauge) in thickness, or of cast metal having a wall thickness not less than ⅛ inch.

f. Junction or pull boxes of over 150 cubic inches in size shall be composed of metal and shall conform to the requirements for cabinets and cutout boxes, except that the covers may consist of single flat sheets secured to the box proper by screws or bolts instead of hinges.

Boxes having covers of this form are for use only for inclosing joints in wires or to facilitate the drawing in of wires or cables. They are not intended to inclose switches, cutouts or other control devices.

g. Outlet boxes intended for use where gas outlets are present shall be so designed that they may be securely fastened to the gas pipes in an approved manner.

h. A fixture stud which is not an integral part of the outlet box shall be composed of malleable iron or other approved material.

i. Switch and outlet boxes shall be so designed that they can be securely fastened in place independently of the support furnished by the conduit; provided, however, that approved boxes having threaded connection to exposed conduit may be supported by the conduit itself if the latter is firmly secured in place.

j. Switch and receptacle boxes shall completely enclose the devices on sides and back, and shall provide a substantial support for them. The screws supporting the box shall not be used for the attachment of the device contained therein. Floor outlet boxes shall be so designed as to protect receptacles and attachment plugs from mechanical injury and moisture.

k. Metal covers of outlet boxes shall be of thickness equal to that of the wall of the box, or shall be lined with firmly attached insulating material not less than 1/32 inch in thickness. Covers of porcelain or other approved material may be used if of such form and thickness as to afford the requisite protection and strength.

l. Flush switch and receptacle plates shall be not less than .04 inch in thickness.

m. At each outlet of conduit, metal raceway, armored cable or knob and tube work an approved box or plate shall be employed. In completed installations, the box or plate shall be provided with a cover, unless a fixture canopy is present.

n. At the ends of conduit, armored cable or metal raceway from which wires extend to open wiring or to appliances and where a box or plate is provided as required in the preceding paragraph, approved terminal fittings having a separate bushed hole for each wire shall be provided through which fitting the wires shall pass without splice, joint or tap. This construction shall not be employed at fixture outlets.

o. In buildings already constructed, where conditions are such that neither box nor plate can be installed, these fittings may be omitted by permission of the inspection department, provided the conduit or armored cable is properly bushed and secured in place.

p. Junction boxes shall be so installed as to be accessible without removing any part of the building except as provided for terminal fittings in section 502, paragraph f of this Code.

An attic which has sufficient headroom but which is reached only by a portable ladder and permanent hatch, is considered permanently accessible.

q. Outlet boxes or plates, switch boxes and cabinets shall be so installed in walls or ceilings composed of plaster on wooden joists or studs that the front edge of the fitting will not set back of the finished surface of the plaster more than ¼ inch. On wooden walls or ceilings the front edges of the fitting shall be flush with the finished surface, or project therefrom. A plaster surface which is broken or incomplete shall be repaired, so that there will be no gaps or open spaces at the edge of the fitting.

These requirements do not apply to walls or ceilings composed of concrete, tile or other non-combustible material.

r. In making a surface extension from an existing outlet of concealed conduit or armored cable, a box, extension ring or blank cover shall be mounted over the original box and electrically and mechanically secured to it. The extension shall then be connected to this box in the manner prescribed for the method of wiring employed in making the extension.

702. CABINETS AND CUTOUT BOXES

a. Cabinets and cutout boxes intended for outdoor use shall be of weatherproofed type.

b. Cabinets and cutout boxes which contain devices or apparatus connected within the cabinet or box to the wires of more than four circuits, including branch circuits, meter loops, sub-feeder circuits, power circuits from lighting panels and similar circuits, but not including the supply circuit or a continuation thereof, shall have back wiring spaces or one or more side wiring spaces, side gutters or wiring compartments, unless the wires leave the cabinet or cutout box directly opposite their terminal connections.

c. The design and construction of cabinets and cutout boxes shall be such as to secure ample strength and rigidity.

d. The spacing within cabinets and cutout boxes shall be sufficient to provide ample room for the distribution of wires and cables placed in them, and for a separation between metal parts of cabinets or cutout boxes and current carrying parts of devices and apparatus mounted within them as follows:

1. There shall be an air space of at least 1/16 inch, except at points of support, between the base of the device and the wall of any metal cabinet or cutout box on which the device is mounted.

2. There shall be an air space of at least 1 inch between any live metal part (including live metal parts of enclosed fuses) and the door, unless the door is lined with an approved insulating material or is of a thickness of metal not less than No. 12 U. S. sheet metal gauge (0.109 inch), when the air space shall be not less than ½ inch.

3. There shall be a space of at least 2 inches between open link fuses and metal lined walls of metal, metal lined or glass paneled doors.

4. Except as noted above, there shall be an air space of at least ½ inch between the walls, back, gutter partition, if of metal, or door of any cabinet or cutout box and the nearest exposed current-carrying part of devices mounted within the cabinet where the potentials do not exceed 250 volts. This spacing shall be increased to at least 1 inch where the potentials exceed 250 volts.

e. Cabinets and cutout boxes shall be deep enough to allow of the closing of the doors when 30 ampere branch circuit panelboard switches are in any position, or when combination cutout switches are in any position, or when other single throw switches are opened as far as their construction will permit.

f. Side wiring spaces, side gutters or side wiring compartments of cabinets shall be rendered tight enclosures by means of covers, barriers or partitions extending from the bases of the devices contained in the cabinet to the door, frame or sides of the cabinet; provided, however, that where the enclosure contains only those wires or cables which are led from the cabinet at points directly opposite their terminal connections to devices within the cabinet, such covers, barriers or partitions may be omitted. Partially enclosed back wiring spaces shall be provided with covers to complete the enclosure.

g. Wooden or composition cabinets, whether for flush or surface mounting, shall be of rigid and substantial design. Doors shall fit closely. The requirements for spacings, barriers and other details of construction, given elsewhere in this section, shall be followed, so far as they apply. Wooden cabinets shall be composed of well seasoned material, at least ¾ inch in thickness thoroughly filled and painted. They shall be lined throughout with a non-combustible material such as ⅛ inch rigid asbestos board firmly secured in place. Linings of slate, marble or approved composition shall be at least ¼ inch in thickness. Sheet metal lining shall be at least .063 inch in thickness (No. 16 U. S. sheet metal gauge).

h. Composition cabinets shall conform to the requirements for wooden cabinets, and shall be submitted for approval prior to installation.

ARTICLE 8. AUTOMATIC PROTECTION OF CIRCUITS AND APPLIANCES: CUTOUT BASES, FUSES, CIRCUIT BREAKERS; PROTECTION OF WIRES, CIRCUITS, MOTORS AND APPLIANCES.

801. CUTOUT BASES

a. The requirements of this article shall not apply to attachment plugs, car lighting cutouts or protective devices for signal systems. Cutout bases for link fuses shall be approved only in capacities above 300 amperes and their spacing shall be at least as great as those given in the following table, which applies only to plain, open fuse blocks mounted on slate, marble or composition bases. If the fuse tips overhang the edges of the fuse block terminals, the spacings shall be measured between the nearest edge of the tips.

Ampere Capacity	Minimum Separation of Nearest Metal Parts of Opposite Polarity	Minimum Break Distance
Not over 125 Volts		
301—1500	1½	1½
Not over 250 Volts		
301—1500	2¾	2

b. A space shall be maintained between the fuse terminals of link fuses of the same polarity of at least ½ inch for voltages up to 125 and of at least ¾ inch for voltages from 126 to 250. This is the minimum distance allowable and greater separation shall be provided when practicable.

c. For 3-wire systems link fuse cutouts shall have the break-distance required for circuits of the potential of the outside wires, except that in 125-250-volt systems with grounded neutral the cutouts in 2-wire, 125-volt branch circuits may have the spacings specified for not over 125 volts.

d. Except for sealable service and meter cutouts the fuse terminals of enclosed fuse cutout bases (plug and cartridge types) shall be of either the Edison plug, spring clip or knife blade type, to take the corresponding standard enclosed fuses. They shall be secured to the base by two screws or the equivalent, so as to prevent them from turning, and shall be so made as to secure a thoroughly good contact with the fuse.

e. End stops shall be provided to insure the proper location of the cartridge fuse in the cutout base.

f. Cutout bases for enclosed fuses shall be classified as regards both current and voltage as given in the following table, and shall be so designed that the bases of one class cannot be used with fuses of another class rated for a higher current or voltage.

STANDARD PLUG OR CARTRIDGE CUTOUTS

Not over 250 volts.	Not over 600 volts.
0-30 amperes	0-30 amperes
31-60 "	31-60 "
61-100 "	61-100 "
101-200 "	101-200 "
201-400 "	201-400 "
401-600 "	401-600 "

SEALABLE SERVICE AND METER CUTOUTS

Not over 250 volts.	Not over 600 volts.
0-30 amperes	0-30 amperes
31-60 "	31-60 "
61-100 "	61-100 "
101-200 "	101-200 "

802. LINK FUSES

a. Link fuses shall not be used when of capacities of 300 amperes or less. When used in capacities of from 301 to 1500 amperes, they shall be rated to correspond to the ratings of cutout bases as given in the table of paragraph a, section 801, of this code.

b. Contact surfaces or tips of link fuses shall be of copper or aluminum, having good electrical connections with the fusible part of the strip.

c. Link fuses shall be stamped with 80 per cent. of the maximum current which they can carry indefinitely, thus allowing about 25 per cent. overload before the fuse melts.

803. ENCLOSED FUSES

a. The requirements of paragraphs c to g, inclusive, of this section, do not apply to fuses for attachment plugs, car-lighting cutouts, nor to protective devices for signal systems.

b. The casings of enclosed fuses shall be sufficiently tight so that lint and dust cannot collect around the fusible link and become ignited when the fuse is blown. For non-renewable fuses the fusible wire shall be attached to the terminals in such a way as to make it difficult for it to be replaced when melted.

c. Enclosed fuses shall be classified to correspond with the different classes of cutouts, and shall be so designed that it will be impossible to put any fuse of a given class into a cutout which is designed for a current or voltage lower than that of the class to which the fuse belongs.

d. Enclosed fuses shall be marked with the words "N. E. Code Std." All fuses shall be marked with the ampere capacity. On ferrule contact fuses this marking shall be on the tube or ferrules, and on knife blade fuses on the tubes or caps. In addition to the above marking each cartridge enclosed fuse shall be provided with a paper label, red for 600-volt fuses, navy blue for 250-volt fuses of 15 amperes or less capacity and green for 250-volt fuses of over 15 amperes capacity. The label for cartridge fuses shall bear the following: the name or trademark of the manufacturer and the voltage for which the fuse is designed.

e. Plug fuses of 15 amperes capacity or less shall be distinguished from those of larger capacity as follows: by an hexagonal opening in the cap through which the mica or similar window shows; or by an hexagonal shaped recess in the top of fuses having porcelain or moulded composition tops, and when labels are used with such plug fuses the labels shall also be hexagonal in shape and fill the recess; or on plugs having solid metal caps, by an hexagonal impression either raised or lowered on the caps.

f. The fuse terminals shall be sufficiently heavy to insure mechanical strength and rigidity. The styles of terminals, except for use in sealable service and meter cutouts, shall be as follows:

Not over 250 volts.

	A. Cartridge fuse (ferrule contact).
0-30 Amps.	B. Approved plugs or cartridge fuses in approved casings for Edison plug cutouts not exceeding 125 volts, but including any circuit of a three-wire 125—250-volt system with grounded neutral.
31-60 "	Cartridge fuse (ferrule contact) for use also in approved casings for large size Edison plug type 250-volt cutouts.
61-100 " 101-200 " 201-400 " 401-600 "	Cartridge fuse (knife blade contact).

Not over 600 volts.

0-30 Amps. 31-60 "	Cartridge fuse (ferrule contact).
61-100 " 101-200 " 201-400 " 401-600 "	Cartridge fuse (knife blade contact).

Cartridge enclosed fuses and corresponding cutout bases, except for sealable service and meter cutouts shall conform to the dimensions given in the table following.

Form 1. CARTRIDGE FUSE—Ferrule Contact

Voltage	Rated Capacity. Amperes.		A Length Over Terminals. Inches.	B Distance between Contact Clips. Inches.	C Width of Contact Clips. Inches.
Not over 250	0-30	Form 1	2	1	½
	31-60		3	1¾	⅝
	61-100	Form 2	5⅞	4	⅞
	101-200		7⅛	4½	1¼
	201-400		8⅝	5	1¾
	401-600		10⅜	6	2⅛
Not over 600	0-30	Form 1	5	4	½
	31-60		5½	4¼	⅝
	61-100	Form 2	7⅞	6	⅞
	101-200		9⅝	7	1¼
	201-400		11⅝	8	1¾
	401-600		13⅜	9	2⅛

Form 2. CARTRIDGE FUSE—Knife Blade Contact

D Diameter of Ferrules or Thickness of Terminal Blades. Inches.	E Min. Length of Ferrules or of Terminal Blades outside of Tube. Inches.	F Dia. of Tube. Inches.	G Width of Terminal Blades. Inches.		Rated Capacity. Amperes.
9/16	½	½		Form 1	0-30
13/16	⅝	¾			31-60
⅛	1	1	¾	Form 2	61-100
3/16	1⅜	1½	1⅛		101-200
¼	1⅞	2	1⅝		201-400
¼	2¼	2½	2		401-600
13/16	½	¾		Form 1	0-30
1 1/16	⅝	1			31-60
⅛	1	1¼	¾	Form 2	61-100
3/16	1⅜	1¾	1⅛		101-200
¼	1⅞	2½	1⅝		201-400
¼	2¼	3	2		401-600

804. CIRCUIT BREAKERS

a. Automatic overload circuit breakers shall be substantial in construction, and shall have ample metal for stiffness. The contact parts shall be arranged so that thoroughly good bearings are obtained. All breakers shall be provided with easily accessible means of tripping them by hand without injury to the operator.

805. General: FUSES AND CIRCUIT BREAKERS

a. Fuses or circuit breakers shall be provided on constant potential circuits to protect all ungrounded wires. A circuit breaker having one of its poles in the grounded wire of the circuit may be used if it simultaneously opens all the wires of the circuit.

For the set of fuses for lighting and appliance branch circuit, see section 807. For use of fuses or circuit breakers on motor circuits, see sections 808 and 809.

b. Fuses and circuit breakers shall be of types approved for the specific service and capacity for which they are to be used. The term circuit breaker as used in this and other sections of this article shall be construed as meaning a device which automatically opens one or more conductors of a circuit with predetermined minimum current overload.

c. A fuse or circuit breaker shall be placed at every point where a change is made in the size of an ungrounded wire, unless the fuse or circuit breaker in the larger wire will protect the smaller.

For carrying capacities of conductors, see section 610, and also see references to capacities of conductors contained in section 808, with special reference to motor circuits.

d. No fuse or circuit breaker shall be placed in any permanently grounded wire, except a circuit breaker which simultaneously opens all conductors of the circuit and except as provided in sections 807 and 808 of this code.

e. Except when placed on switchboards or the equivalent which are located in approved rooms or fireproof electric closets, all cutout bases, circuit-breakers and fused switches shall be inclosed in approved cabinets or cutout boxes or shall be so designed or otherwise protected or located so that live parts will not be exposed to accidental contact. They shall, in all cases, be placed in readily accessible locations.

f. In general, such cabinets shall be placed in a vertical position. By special permission of the Inspection Department such cabinets containing fuses or switches only may be installed horizontally on ceilings, but in such cases, special precautions shall be taken to prevent fuses falling out, or switches opening, due to vibration or other causes. Doors or covers of such ceiling mounted cabinets shall be arranged so as to prevent their accidental opening.

g. Cutout bases, fused switches and circuit-breakers when installed in locations exposed to moisture shall be mounted in approved weatherproof cutout boxes or cabinets.

h. Cutout bases and circuit-breakers shall not be placed where exposed to mechanical injury nor in the vicinity of easily ignitable material nor in places where combustible dust or flyings are liable to be present in the air in sufficient quantities to produce an explosive or flammable mixture. If the occupancy of the premises is such that the last two conditions cannot be avoided all fuses and all circuit-breakers, unless of the dust-tight, oil-immersed type, shall be inclosed in approved metal cabinets. If the occu-

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pancy of the building is such that a suitable location free from exposure to mechanical injury cannot be found, an approved metallic inclosure shall be provided.

For equipments in extra-hazardous locations, see article 32.

i. Except as provided in sections 807, 808 and 809 of this code the rated capacity of fuses shall not exceed the allowable carrying capacity of the wire as given in section 610 of this code; and circuit-breakers shall not be set more than 30 per cent. above the allowable carrying capacity of the wire unless a fuse of a rating which properly protects the wires is also installed on the circuit.

j. For the protection of wires having safe carrying capacities exceeding the rated capacity of the largest approved enclosed type fuses, approved enclosed fuses arranged in multiple may be used, provided as few fuses as possible are used and the fuses are of equal capacity and provided the cutout terminals are mounted on a single continuous pair of substantial bus bars. The total capacity of the fuses shall not exceed the safe carrying capacity of the wires. This paragraph shall not apply to motor circuits.

k. Fixture wires or flexible cords of No. 16 or No. 18 gauge shall be considered as protected by 15 ampere fuses.

l. Link fuses may be used only when mounted on approved bases which, except on switchboards, shall be placed in approved cutout boxes or cabinets. A space of at least 2 inches shall be provided between the open-link fuses and metal, or metal lined walls or metal, metal lined or glass paneled doors of cabinets or cutout boxes.

m. Fused rosettes shall not be used.

n. An automatic circuit-breaker, except as provided for generators in article 1002 of this code, when installed without other automatic overload protective devices, shall have one pole in each ungrounded conductor.

o. For all automatic circuit breakers, the number of overload trip coils shall not be less than shown in the following table:

CONCRETE BLOCKS CONCRETE BRICK CONCRETE LINTELS

Bellfield Concrete Products Co.

Bellfield Avenue and Armstrong Lane Philadelphia

Bell, Wyoming 6142

SYSTEM	NUMBER AND LOCATION OF OVERLOAD PROTECTIVE DEVICES
3 wire 3 phase A.C. ungrounded or with one conductor grounded	2 trip coils, one in each of two ungrounded conductors
3 wire 3 phase A.C. with grounded neutral	3 trip coils, one in each conductor or two trip coils and one fuse
4 wire 3 phase A.C.	3 trip coils, one in each phase, or two trip coils and one fuse
4 wire 2 phase A.C. ungrounded	2 trip coils, one in each phase
3 wire 2 phase A.C.	2 trip coils, one in each outside conductor
4 wire 2 phase A.C. with grounded neutral	4 trip coils, one in each ungrounded conductor, or two trip coils and two fuses
5 wire 2 phase A.C.	4 trip coils, one in each ungrounded conductor, or two trip coils and two fuses
3 wire 1 phase A.C. or D.C.	2 trip coils, one in each outside conductor
2 wire A.C. or D.C. ungrounded or with one conductor grounded	1 trip coil, in ungrounded conductor
2 wire A.C. or D.C. with grounded neutral	2 trip coils, one in each conductor

p. A fuse or a trip coil shall be placed in every ungrounded wire of all grounded circuits except as provided for branch circuits in section 807 of this code.

q. Nothing in this section shall be considered as prohibiting the use of two single-pole circuit-breakers for the protection of ungrounded two-wire circuits.

806. AT SERVICES

For particular equipment at services, see also section 405 of this code.

a. Fuses or circuit-breakers shall be placed in all ungrounded service wires, either overhead or underground, in the nearest readily accessible place to the point where they enter the building, and arranged to cut off the current from all circuits and devices in the building other than the service switch and, under conditions specified below, the meter; except, however, that service fuses may be located at outer end of service conduit.

b. When the service fuses are locked or sealed, or are located at the outer end of the service conduit, duplicate main fuses or branch fuses connected on the load side of the meter and enclosed in an approved casing or cabinet, so as to be readily accessible to the occupant of the building, shall be provided.

c. Where service switch, service fuses and meter are combined in an approved self-contained device or compact combination of such devices having no exposed wiring or live parts, the potential coils of the meter may be connected on the supply side of the service cutout. Except when such devices are used or the service fuses are located at the outer end of the service conduit, the service switch shall be arranged to cut off current from the service fuses.

d. Except when mounted on switchboards under competent supervision, the service fuses shall be enclosed so that live parts will not be exposed to accidental contact.

e. In properties having generating plant or which are served by a master service, the wires running from building to building shall not be considered as service wires so that fuses or circuit breakers will not be required where the wires enter buildings, provided the next fuse or circuit breaker back on the line properly protects the wires inside buildings.

f. Where a group of buildings is supplied from one service or generating plant, provision shall be made so that the service to any one of the buildings may be disconnected. This may be accomplished by a disconnecting switch within the building served or by a feeder switch or circuit breaker.

g. When out buildings, such as a garage, are to be supplied from a main building and it is desired to install a 3-way switching between the main and out building, such 3-way connection shall not be considered as service wires to the out building, provided the load shall not exceed the capacity of the 3-way switch and shall not be in excess of 15 amperes.

807. FUSES FOR LIGHTING AND APPLIANCE BRANCH CIRCUITS

a. For the purposes of this section, the terms "Branch Circuit," "Outlet" and "Appliances" are defined as follows:

"Branch Circuit"—

Branch circuit is that portion of a wiring system extending beyond the final fuse or fuses protecting it.

For particular applications to motor branch circuits, reference should be made to article 808.

"Outlet"—

An outlet is that fixed point on a branch circuit at which current is taken to supply fixtures and appliances. An outlet having a fixture with more than one socket attached shall be considered as one outlet. An outlet having a multiple receptacle installed therein shall be considered as one outlet.

"Appliances"—

Appliances are current consuming devices for domestic or general commercial use, such as heating, cooking and small motor operated devices, etc., suitable for use on 15 ampere branch circuits.

b. All ungrounded wires of a branch circuit shall be protected by fuses or circuit breakers. When the grounded conductor is identified and properly connected, branch circuits shall be protected by fuses in the ungrounded wires only. In locations where the conditions of grounding or the liability of the reversal of connections warrant, the inspection department may require, on systems having a grounded neutral or having one side grounded, that both wires of two-wire branch circuits, shall be fused, even though the grounded conductor is identified and properly connected.

c. Two-wire branch circuits on ungrounded systems shall be protected by a fuse in each wire.

d. Circuit breakers, if used in lieu of fuses, shall be of a type specifically approved for this purpose.

e. Three-wire branch circuits may be run from direct current or single phase alternating current systems having a grounded neutral, in which case the neutrals of the branch circuits shall not be inter-connected except at the center of distribution.

f. Branch circuits in general, and except as described below, shall be protected by fuses of no greater rated capacity than

15 amperes ..... at 125 volts or less
10 amperes ..... at 126 to 250 volts

g. Fixture wire or flexible cord of No. 18 or No. 16 gauge shall be considered as properly protected by 15 ampere fuses.

Receptacles for attachment plugs (appliance or convenience outlets) are strongly recommended in order to facilitate the use of electrical appliances which, otherwise, must be connected to sockets designed primarily only as lamp holders.

h. On a 2-wire branch circuit and on either side of a 3-wire branch circuit, the number of outlets shall not exceed twelve (12) except by permission of the inspection department.

i. Branch circuits supplying only sockets or receptacles of the mogul type shall have the wires protected by fuses having a rated capacity not greater than

40 amperes .....at 125 volts or less
20 amperes .....at 126 to 250 volts

j. If protected by 40 or 20 ampere fuses as above, wire not smaller than No. 12 shall be used for wiring fixtures with mogul sockets and receptacles and may also be used for taps not over 18 inches long from the circuit wires to the points of suspension of the fixtures.

k. The number of mogul sockets on a 2-wire branch circuit and on either side of a 3-wire branch circuit shall not exceed eight (8) except by permission of the inspection department.

808. PROTECTION OF MOTOR CIRCUITS

a. The conductors of circuits supplying current to a single motor shall have a carrying capacity, according to section 610 of this code which is not less than 110% of the name plate current rating of the motor.

In the case of circuits supplying current to a single A.C. motor of the type having a large starting current the carrying capacity of the conductors in that portion of the motor circuit between the mains and the motor protective device will usually exceed 110% of the motor name plate current rating. Otherwise the rating of the fuses or the setting of the circuit-breaker necessary in view of the large starting current would be too large to protect the conductors. When an auto transformer starter is employed for starting such a motor the necessary current capacity of the conductors will seldom need to exceed 250% of the motor name plate current rating for ratings not over 30 amperes and 200% for larger ratings. When auto transformer starters are not used for starting such motors the current capacity of the conductors will seldom need to exceed 300% of the motor name plate rating. The carrying capacity of the conductors in that portion of the motor circuit between the motor protective devices and the motor need not be greater than the rating or setting of the fuses, thermal cutouts, relays or circuit-breaker required for the protection of the motor in section 809 except that in no case should this capacity be less than 110% of the current rating of the motor.

Similarly, when other types of motors are used in classes of service having heavy peak loads, the carrying capacity of the conductors in the motor circuit must largely exceed the minimum value of 110%

of the motor name plate current rating. In the majority of cases this value, actually determined by the ratings of the fuses or the setting of the circuit-breaker, need not exceed the percentages of the motor name plate current ratings given in the following table:

	PERCENTAGE OF NAME PLATE CURRENT RATING				
CLASSIFICATION OF SERVICE	5 minute rating	10 and 15 minute rating	30 and 60 minute rating	2 hour rating	Continuous rating
Operating valves raising or lowering rolls	110	120	150	200	250
Rolling tables	110	120	135	180	200
Hoists, rolls, ore and coal handling machines	110	115	120	150	170
Freight and passenger elevators, shop cranes, tool heads, pumps, etc.	110	110	110	120	140

b. Each ungrounded conductor of a circuit supplying current to motors shall be protected by a fuse or by a circuit-breaker, except the conductors supplying current to a single motor and which are suitably protected from mechanical injury shall be considered as sufficiently protected by the fuses or circuit-breakers next back on the line if the carrying capacity of these conductors is at least ⅓ of that of the wires to which they are connected and their length to the motor protective devices does not exceed 25 feet. A fuse or circuit-breaker shall not be placed in any permanently grounded conductor supplying current to the motors, except that a circuit-breaker, with one pole in each conductor may be used provided the breaker is so designed that the pole in the grounded conductor cannot be opened without opening simultaneously all of the conductors of the circuit.

c. When a fuse is used to protect a conductor of a motor circuit its rating shall not exceed the allowable current carrying capacity of the conductor as determined from the tables of section 610 of this code and according to the kind of insulation on the conductor, except that when the circuit supplies a single A.C. motor of the type having large starting current the rating of the fuse may be determined by taking for the carrying capacity of the conductor the value given in column C of the tables without regard to the kind of insulation on the wire. The above should not be interpreted as allowing the use of a rubber-covered or varnished cambric covered conductor having a carrying capacity of less than 110% of the motor current rating according to tables A and B of section 610 respectively in a circuit supplying current to a single motor.

d. When a circuit-breaker is used to protect a conductor of a motor circuit it shall not be set at more than 30% above the current carrying capacity of the conductor as determined from the tables of section 610 of this code, and according to the kind of insulation on the wire.

e. The wires in that portion of a motor circuit between a motor running protective device which is shunted or cut out during the starting period and its motor shall be considered as sufficiently protected during the starting period if there is a fuse or circuit-breaker back on the line which is rated or set at not more than 500% of the name plate rating of the motor.

f. The shunt circuits of a remote control motor controller shall be considered as being sufficiently protected by the motor circuit protective device required by the preceding paragraphs of this section provided they are suitably protected from mechanical injury and do not extend beyond the machine on which the starter may be installed.

809. PROTECTION OF MOTORS

a. Motors of other than continuous rating or used on other than constant load duty and continuous rated motors of 2 h.p. or less shall be considered as being sufficiently protected by the automatic overload protective devices used to protect the conductors of the motor circuits as provided in section 808 of this code.

b. Each continuous rated motor of over 2 h.p. when used for constant load duty shall be individually protected by fuses, thermal cutouts or relays or by a circuit-breaker in accordance with the following paragraphs except (a) as provided for cranes and hoists in section 3006 of this code, (b) when grouped with fuses or thermal cutouts as provided below, or (c) during the brief period of starting as provided in paragraph f of this section.

1. When fuses are used for the running protection of motors, a fuse shall be placed in each ungrounded conductor. The rating of these fuses shall not exceed 125% of the name plate current rating of the motor unless this is not a value corresponding to a standard rating for fuses, when the next higher standard fuse rating may be taken.

2. Two or more small motors grouped under the protection of a single set of fuses and with or without other current consuming devices in the circuit shall be considered as being sufficiently protected if the rating of the fuses does not exceed 15 amperes and if the total wattage of the circuit does not exceed 1320.

3. Thermal cutouts used to provide running protection for a motor shall have ratings not exceeding 125% of the name plate current rating of the motor unless this is not a value corresponding to a standard rating for thermal cutouts when the next higher rated thermal cutout may be used.

4. Thermal cutouts shall not be used unless they are enclosed in cabinets, cutout boxes or similar enclosures and next back on the line there are fuses of a rating with which the thermal cutouts can be used safely as indicated by the marking on the cutouts.

5. Two or more motors without regard to size and each with thermal cutouts for running protection may be grouped on a single motor circuit having fuses for the protection of its conductors provided the rating of the fuses does not exceed the rating with which the smallest thermal cutout of the group can be used safely as indicated by the marking on the thermal cutout.

6. If an overload relay is used to provide running protection for a motor it shall have a continuous current capacity of at least 110% of the name plate current rating of the motor. If the overload relay is of the time limit type its setting shall not exceed 125% of the name plate current rating of the motor and if of the instantaneous type its setting shall not exceed 160% of the name plate current rating of the motor.

7. Circuit-breakers may not be used for the running protection of motors except (a) where fuses are also provided according to subparagraphs 1 and 2 preceding, (b) on main switchboards, (c) where otherwise subject to competent supervision, (d) where next back on the line are fuses rated or circuit-breakers set at not over 300% of the motor name plate current rating, or (e) for circuits having a maximum capacity greater than that for which approved enclosed fuses are rated.

8. Circuit-breakers shall have a continuous current capacity of at least 110% of the name plate current rating of the motor. If the circuit-breaker is of the time limit type its setting shall not exceed 125% and if of the instantaneous type not over 160% of the name plate current rating of the motor.

9. Circuit-breakers shall open all ungrounded conductors of the circuit simultaneously except that for D.C. and single phase A.C. motors on ungrounded circuits one single pole circuit-breaker may be used in each conductor or a single pole circuit-breaker may be provided in one conductor and a fuse in the other. One pole of the circuit-breaker may be placed in a permanently grounded conductor provided the circuit-breaker is so designed that the pole in the grounded conductor cannot be opened without opening simultaneously all of the conductors of the circuit.

c. The number of overload trip coils, relays or thermal cutouts shall not be less than shown in the table of section 805 o.

d. A controller for a D.C. motor which has an overload release device operative during the starting as well as the running period may also serve as the automatic overload protective device required by paragraph b.

e. The controller for an A.C. motor may also serve as the automatic overload protective device required by paragraph b, if it is equipped with the number of trip coils called for in the table of section 805 o and if it is operative when in the running position to open all of the ungrounded conductors automatically under overload.

f. Motor running protective devices may be shunted or cut out during the period for starting the motor and the motor shall be considered sufficiently protected during this starting period by the next overload protective device back on the line if the rating of this fuse or the setting of this circuit breaker is not over 500 per cent. of the name plate current rating of the motor.

g. When a switch is used to shunt the motor running protective device during the starting period, it shall be of a type that cannot be left in the starting position.

For motors having large starting currents, such as the squirrel cage type, the shunting or cutting out of service of the runnng protective devices is necessary to avoid opening the circuit during the starting period, unless a time limit circuit breaker or similar device is used which will prevent the opening of the circuit during this period.

810. PROTECTION OF GENERATORS

See section 1002.

811. PROTECTION OF ELECTRICALLY HEATED APPLIANCES

a. Electrically heated appliances each of 6 amperes or 660 watts or less, may be used on branch lighting circuits; appliances each of 1320 watts or less, may be grouped on a special circuit protected by fuses having a rated capacity not greater than 15 amperes. Each complete electrically heated appliance, whether containing one or more heating elements, which is of more than 1320 watts total capacity, shall be supplied by a separate branch circuit.

b. Subdivided circuits of electrically heated appliances need not be separately fused, but individual heating elements of such electrically heated appliances shall be fused if they are rated at more than 30 amperes.

812. PROTECTION OF THEATRE FOOTLIGHTS AND BORDER LIGHTS

a. Theatre footlights and border lights shall be so wired that the number of outlets and the lamps connected to them shall in no case be such as to place more than 15 amperes on a branch circuit fuse.

813. PROTECTION OF SIGNS AND OUTLINE LIGHTING

a. Circuits shall be so arranged that the number of outlets and the lamps connected to them shall in no case be such as to place more than 15 amperes on the branch circuit fuse.

814. PROTECTION OF SWITCHBOARD INSTRUMENTS

a. Enclosed fuses shall be used to protect instruments and pilot lights on switchboards. N. E. Code standard enclosed fuses are preferred, but other types may be used provided the rating of such fuses does not exceed two amperes.

815. PROTECTION OF FEEDERS AT SUPPLY STATIONS

a. Each constant potential circuit entering or leaving a supply station, except grounded neutral conductors of three wire systems, shall be protected from excessive current by an approved automatic overload circuit breaker or by an equivalent device of approved design. Such protective devices shall be located as near as practicable to point where conductors enter or leave the building. For outgoing circuits not connected with other sources of power, however, the protective devices may be placed on the supply side of transformers or similar devices.

ARTICLE 9. GROUNDING

901. GENERAL

a. Where low potential circuits, arresters, equipment, conduit, armored cable, metal raceways and the like are grounded in accordance with this article, they shall be so arranged that under normal conditions of service there will be no objectionable passage of current over the grounding conductor. Where an objectionable flow of current over a grounding conductor occurs due to the use of multiple grounds, one or more of such grounds shall be abandoned or their locations shall be changed.

b. The connection and contact with the ground shall be permanent and effective, and shall always be made on a water piping system if one is available. The protective grounding of electrical circuits and equipment to water piping systems, when performed in accordance with this article, should always be permitted, since such grounding offers the most efficient protection to life and property and is not injurious to the piping systems.

c. Artificial grounds, such as buried plates, driven pipes or driven rods, shall be imbedded below permanent moisture level, where practicable. Each ground shall present not less than 2 square feet of surface to exterior soil. Ground plates of copper shall be at least .06 inch in thickness. Ground plates of iron shall be at least ¼ inch in thickness. Ground pipes of iron or steel shall be galvanized and shall be not less than ¾ inch internal diameter. Approved ground rods shall not be less than ½ inch in diameter. Driven pipes or rods shall be of only one piece when of less than standard commercial length and shall be driven to a depth of at least eight feet regardless of size or number of pipes or rods used.

It is recommended that artificial grounds be located where the ground water level is nearest to the surface.

Additional area will generally be necessary, to meet the requirement of paragraph e of this section.

d. Where a system grounding wire is employed, it shall be effectually grounded at intervals which will satisfy the requirements as to current carrying capacity and resistance prescribed in this article.

e. The combined resistances of the grounding wire and the connection with the ground shall not exceed 3 ohms for water pipe connections nor 25 ohms for buried or driven grounds. Where it is impracticable to obtain with one ground artificial ground resistance as low as 25 ohms, this requirement shall be waived, and two artificial grounds, at least 6 feet apart and with combined area of not less than 4 square feet, shall be provided.

902. DISTRIBUTION SYSTEMS

a. Two-wire direct current systems shall be grounded as provided herein, if fed from overhead circuits and the voltage of the system does not exceed 300 volts.

It is recommended that 2-wire direct current systems be grounded if a neutral point can be established and if the maximum difference of potential between the neutral point and any other point on the circuit does not exceed 300 volts.

It is recommended that 2-wire direct current systems be not grounded if the potential to ground of either conductor exceeds 300 volts.

b. Three-wire direct current systems shall be grounded as provided in this article and at the neutral, at one or more supply stations but not at individual services.

c. Alternating current systems shall be grounded as provided in this article, if the maximum difference of potential between the grounded point and any other point on the circuit does not exceed 150 volts. Electric furnace circuits need not be grounded.

It is recommended that such systems also be grounded as provided herein, if the difference of potential exceeds 150 volts but does not exceed 300 volts.

d. On single phase alternating current systems the ground shall be made at each service on the line side of the service switch before the service is connected to the line. On multiphase alternating current systems the ground shall be made as described for single phase systems if the grounded conductor of the multiphase supply system is brought to the premises for rendering service. By permission of the inspection department the grounding connection for either single phase or multiphase systems may be made on or near the transformer or transformers, or by connection to a system ground wire.

e. For alternating current systems, the point to be grounded shall be selected as follows:

Single phase, 2-wire: on either conductor, and at that point of the system which brings about the lowest voltage from ground of unguarded current-carrying parts of connected devices and also permits of most convenient grounding.

Single phase, 3-wire: on neutral conductor.

Two phase or Three phase, Three, Four or Five wire systems. — At that point of the system which brings about the lowest voltage from ground of unguarded current-carrying parts of connected devices and also permits of most convenient grounding.

f. Where only one phase of a 2-phase or 3-phase secondary system is employed for lighting, that phase shall be grounded, and at the neutral conductor if one is used.

g. Where transformers supply a common set of mains, such fuses as are installed shall be so placed as not to leave any portion of the secondary without ground protection after they have been blown.

h. The grounded conductor of an interior wiring system shall have but one grounding connection within the building, except as provided in paragraph b of section 906 of this article.

903. LIGHTNING ARRESTERS AND GROUND DETECTORS

a. The ground connection shall be made at such a point that the grounding conductor will be as short and straight as practicable.

904. EQUIPMENT AND METAL RACEWAYS

a. The point of attachment of the grounding conductor to generators, motor transformers, conduit, armored cable, metal raceway and the like shall, if practicable, be readily accessible.

b. The point of attachment of the grounding conductor to conduit, armored cable and metal raceways shall be as near as practicable to the point where the conductors in the equipment receive their supply.

c. Where the service conduit is grounded, its grounding conductor shall be run from it directly to the ground, no portion of the house conduit being used as a part of the grounding conductor.

905. GROUNDING CONDUCTORS

a. The grounding conductor shall be of copper or of other metal which will not corrode excessively under the existing conditions and where practicable shall be without joint or splice.

b. No automatic cutout shall be placed in a grounding conductor or its connections, except in a grounding conductor from equipment where its operation will result in the automatic disconnection from all sources of energy of the circuit leads connected to the equipment so grounded.

c. The insulation and installation of the grounding wire for circuits, when not protected by metallic piping, shall comply with all requirements of this code applying to wires of the voltage of the circuit to which the grounding wire is attached. When a circuit grounding wire is installed in metallic piping and is bonded to it at both ends, a bare copper conductor may be used.

d. Ground clamps and all grounding which are smaller than No. 4 in size shall be protected from ordinary mechanical injury by being placed where they are not liable to be damaged or by being inclosed in metal, wood or equivalent protective covering. In the case of a lightning arrester grounding wire the protection shall be composed of non-magnetic material, unless the grounding conductor is electrically connected to both ends of the protective covering.

e. Where a secondary system is grounded at the service, the equipment, conduit, armored cable, metal raceway and the like may, with the permission of the inspection department be connected to the circuit grounding conductor, but otherwise shall have a separate grounding conductor of their own.

f. The path to ground provided for a circuit shall, in general, have ampere capacity sufficient to insure the continuity and continued effectiveness of the path under conditions of excess current caused by accidental grounding of any normally ungrounded conductor of the circuit.

g. The grounding conductor for a direct current system shall have a current capacity not less than that of the largest feeder of the same system leaving the station. In no case shall the grounding conductor be smaller than No. 8.

h. The grounding conductor for an alternating current system shall have an ampere capacity not less than one-fifth that of the conductor to which it is attached. In no case shall the grounding conductor be smaller than No. 8 and it need not be larger than No. 0.

i. The conductor grounding a lightning arrester shall not be connected to an artificial ground provided for circuits or equipment, but shall be kept at a distance of at least 20 feet where practicable. The grounding conductor shall have an ampere capacity sufficient to insure the continuity and continued effectiveness of the path to ground under conditions of excess current caused by or following the discharge of the arrester. No individual grounding conductor shall have an ampere capacity less than No. 6.

j. The size of a conductor (wire or pipe) grounding conduit, armored cable, metal raceways and equipment shall be not less than that given in the following table:

Capacity of nearest cutout protecting conductors in conduit armored cable metal raceway or equipment	Size of Copper wire Grounding Conductor	Size of Grounding Pipe
0 to 100 amperes	No. 10	½ inch
101 to 200 "	No. 6	½ "
201 to 500 "	No. 4	¾ "
Over 500 "	No. 2	1 "

No. 18 copper may be used as a conductor grounding portable equipment, the conductors to which are protected by fuses not greater than 15 amperes. For portable equipment using more than 15 amperes, the above table shall be followed.

k. Where instruments, meters, or relays operate with windings or working parts, at a potential of 150 volts or above to ground, the cases and other exposed bare metal parts of these devices insulated from the current carrying parts shall be grounded unless isolated by elevation or protected by suitable insulating barriers or guards or where inaccessible to other than qualified persons, in which case grounding is required only when the voltage exceeds 750. The grounding conductor shall be not less than No. 12. Where instrument, meters or relays are operated from current or potential instrument transformers, the cases and other exposed bare metal parts which are insulated from the current carrying parts shall be grounded. The grounding conductor shall be not less than No. 12. If exposed to higher voltages through transformer windings or otherwise, secondary circuits of current and potential transformers of less than 750 volts shall be isolated or grounded unless placed in grounded conduit or other suitable duct, or identified and guarded as required for conductors of the highest voltage to which they are exposed. When a grounding conductor is used it shall be not smaller than the conductor of the secondary circuit.

1. Sections of conduit, armored cable, metal raceways or other equipment shall be bonded together and the whole grounded, or each section shall be separately grounded. Equipment in the immediate vicinity of gas pipes shall be bonded thereto. This requirement shall not apply to service runs or to isolated lengths of conduit, armored cable or metal raceway not exceeding 25 feet, provided the runs are free from metallic contact with the ground and adjacent grounded metal and are guarded when within reach from grounded surfaces.

906. GROUNDED CONNECTIONS

a. Where a non-conductive protective coating, such as enamel, is provided for equipment, couplings and fittings, such coating shall be completely removed from threads and other surfaces in order to insure a good contact between ground clamp and equipment. Pipes or rods used to provide a

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ground shall be cleaned of rust, scale, paint, etc., at the point of attachment of the ground clamp. The connection and contact with the ground shall be permanent and effective, and shall always be made on a water piping system if one is available.

The protective grounding of electrical circuits and equipment to water piping systems, when performed in accordance with this article, should always be permitted, since such grounding offers the most efficient protection to life and property and is not injurious to the piping systems.

b. At supply stations, grounding conductors for circuits, equipment and lightning arresters shall be permanently and effectively connected to all available active, continuous, metallic underground piping systems between which no appreciable difference of potential normally exists; otherwise, to one system only. Elsewhere than at supply stations, the grounding connected to at least one such piping system, if available. Gas piping shall be avoided wherever practicable, except as provided in paragraph e of this section. Where underground metallic piping systems are not available, other grounds, which will provide the desired permanence and conductance, may be permitted.

c. The point of connection to the piping system shall be located on the street side of water meters except where the conductor serves as a ground only for equipment, conduit, armored cable, metal raceway and the like or as a multiple ground for an alternating current secondary. In these latter cases the point of connection may be located near the equipment to be grounded, and care shall be taken to keep the connection with the underground piping system continuous and permanent, by bonding all parts of the piping system which are liable to become physically disconnected, such as at meters and service unions, by means of a shunt consisting of two approved clamps and a conductor of the same size as the grounding conductor. Where practicable, the point of connection shall be in plain sight and readily accessible. When water meters are located outside of buildings or in pits within buildings where piping connections are under concrete or other substantial flooring, the ground connection may be made on the building side of the meters but as close to them as is practicable.

d. The ground conductor shall be attached to the pipe or rod (a) by means of an approved bolted clamp to which the conductor is soldered or otherwise connected in an approved manner, or (b) by means of a brass plug screwed into the pipe and provided with a lug to receive the conductor, or (c) by other approved means.

e. Gas piping systems within buildings shall be used as a ground only when water piping is not available, and then only for grounding equipment; provided, however, that gas piping may serve as the sole ground for small fixtures located at a considerable distance from water piping. Where gas piping is so utilized, it shall be bonded to the water piping system at their points of entrance. Gas piping need not be insulated from otherwise well grounded fixtures.

f. Rails or other grounded conductors of electric railway circuits shall not be used as a ground for other than railway lightning arresters and railway equipment, conduit, armored cable, metal raceway and the like, when other effective grounds are available.

ARTICLE 10. ROTATING MACHINERY AND ITS CONTROL APPARATUS

1001. GENERAL

a. The frame, except for portable motors, shall be grounded if the machine operates at a potential in excess of 150 volts and is accessible to other than qualified persons. Grounding shall be performed in the manner prescribed in article 9 of this code. When the frame is not grounded, owing to the voltage being below 150 or the generator being accessible only to qualified persons or the motor being portable, the frame shall be permanently and effectively insulated from ground.

b. The frames of portable motors which operate at more than 150 volts shall be guarded or grounded.

It is recommended that the frames of portable motors which operate at less than 150 volts be grounded when this can be readily accomplished.

c. If terminal blocks are used, they shall be composed of approved non-combustible, non-absorptive insulating material, such as slate, marble or porcelain.

d. Soft rubber bushings may be used to protect lead wires where they pass through the frame, provided they will not be exposed to oils, grease, oily vapors or other substances having a deleterious effect on rubber. Where so exposed, bushings composed of porcelain, micanite or hardwood treated with a preservative shall be used.

1002. GENERATORS

a. Generators shall be located in dry places. They shall not be placed in a room where any hazardous process is carried on, nor where they will be exposed to inflammable gases or flyings of combustible materials.

It is recommended that waterproof covers be provided for use in an emergency.

b. Where wooden base frames or wooden floors serve to insulate frames from ground they shall be kept filled with moisture repellent and be kept clean and dry.

c. Direct current, constant potential generators, other than exciters for alternating current machines, shall be protected from excessive current by automatic cutouts of approved design; provided, however, that in central stations where the type of apparatus used and the nature of the system operated make protective devices inadvisable and unnecessary, their omission may be permitted by the inspection department. Single pole protection shall be accepted for 2-wire, direct current generators, if the protective device is actuated by the entire generator current and will completely open the generator circuit.

d. If a generator not electrically driven supplies a 2-wire grounded system, the protective device shall be so placed as to disconnect the generator from all wires of the circuit.

e. Two wire, direct current generators, used in conjunction with balancer sets to obtain neutrals for 3 wire systems, shall be equipped with protective devices which will disconnect the 3-wire systems in the case of excessive unbalancing of voltages.

f. Three-wire, direct current generators, whether compound or shunt wound, shall be equipped with protective devices, one in each

armature lead and so connected as to be actuated by the entire current from the armature. Such protective device shall consist either of a double-pole, double-coil, overload circuit breaker, or of a 4-pole circuit breaker connected in the main and equalizer leads and tripped by two overload devices, one in each armature lead. Such protective devices shall be so interlocked that no one pole can be opened without simultaneously disconnecting both leads of the armature from the system.

g. Where a generator and a transformer are intended to operate as a unit for stepping up or stepping down the voltage, and are both located in the same building, a protective device between them shall not be required.

h. Each generator shall be provided with a name-plate giving the maker's name, the rating in kilowatts, if direct current, or kilovolt amperes, if alternating current, the normal volts and amperes corresponding to the rating, and the revolutions per minute.

1003. MOTORS

a. Motors shall not be operated in series-multiple or multiple-series except on constant-potential systems where permission has been granted by the inspection department.

b. Motors having brushes or sliding contacts exposed to combustible dust shall be located in separate dust-tight rooms or non-combustible housings provided with effective ventilation from a source of clean air.

c. In places where combustible dust is thrown into suspension in the air in sufficient quantity to produce explosive mixtures, such as in flour mills, grain elevators, etc., or where it is impracticable to prevent dust or flying material collecting in dangerous quantities on or in motors, all motors shall be either of the totally enclosed type or placed in separate dust-tight rooms or non-combustible housings. Such rooms or housings shall be effectively ventilated from a source of clean air.

d. Motors permanently located on wooden floors shall be provided with suitable drip pans, if so required by the inspection department.

e. Adjustable speed motors, if controlled by means of field regulation, shall be so equipped and connected that they cannot be started under weakened field, unless this safeguard is incorporated in the design of the machine.

f. Each motor shall be provided with a name-plate giving the maker's name, the ratings in volts and amperes, the normal full-load speed and the interval during which it can operate, starting cold. The time interval given shall be either 5, 10, 15, 30, 60 or 120 minutes, or continuous.

g. Each motor with its starting device shall be controlled by an indicating switch so arranged that the opening of the switch will disconnect all ungrounded leads; provided, however, that this requirement shall not apply to crane motors, considered in article 30 of this code. The switch shall have a continuous duty rating at least equal to 110% of the motor name plate current rating. A double-throw switch used to shunt the motor protective device during the starting period shall be of such type that it cannot be left in the starting position. An automatic circuit breaker which disconnects all ungrounded wires of the circuit may serve also as a switch. The switch and starting device shall be located within sight of the motor, unless permission to locate them elsewhere is given by the inspection department. A single pole switch may be used to control a 2-wire motor of not over ¼ horsepower, operating at a potential not exceeding 300 volts.

h. The switch called for in the preceding paragraph may be omitted if the motor starting device disconnects all ungrounded wires of the circuit, except when auto-transformer starters are used. When auto-transformer starters are used a switch shall be provided on the supply side of each auto-transformer starter or group of auto-transformer starters and shall be located within sight of the starter or starters controlled.

i. This switch may be of the disconnecting type if it is not intended to be operated under load and if it is so located or locked that it cannot be readily operated by unqualified persons.

j. Alternating current motors operating freight or passenger elevators or cranes that are dependent on phase relation for the direction of rotation shall be protected by approved automatic circuit breakers (or reverse phase relays) operative in the event of any phase reversal that would cause a reverse motor rotation, or in the event of the motor being connected to the line single phase.

1004. AUTO-TRANSFORMER STARTERS

a. Control apparatus, other than autotransformer starters, shall conform to the requirements of article 17 of this code.

b. The coils and switches of auto-transformer starters used in places where combustible dust or flyings are liable to be present in the air in sufficient quantities to produce an explosive or flammable mixture shall be completely inclosed in a substantial dust-proof metal case. All load-carrying contacts of such switches shall be oil immersed unless inclosed in a dust-tight metal case.

c. Cases for coils or switches shall afford access to the interior for inspection and oil renewal, and shall be so constructed that when mounted on a plane surface the case will make contact with such surface only at points of support. An air space of at least ¼ inch shall be maintained between case and surface.

d. The oil tank shall be marked in a suitable manner to indicate the proper oil level. When such device carries a visual oil indicator, the marking shall be for the proper oil level with the starter assembled. If the visual indicator is not used, markings shall indicate the oil level prior to assembling.

e. The switch shall provide an off position, a running position and at least one starting position. It shall be so designed that it cannot rest in a starting position, or in any position which will render inoperative the overload protective devices in the circuit.

ARTICLE 11. TRANSFORMERS: UNDER 600 VOLTS

1101. EXCEPTION

a. Nothing in this article shall be construed to apply to apparatus or fittings, the operation of which depends either wholly or in part upon special air-cooled transformers embodied in the devices; but all such apparatus or fittings shall be submitted for special examination and approval before being installed.

1102. GENERAL

a. No oil-filled transformer shall be placed within any building other than a central station or a sub-station, except by permission of the inspection department; nor shall such a transformer be attached to a building except by permission of the inspection department and when separated therefrom by substantial supports.

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b. No air-cooled transformer operating at a potential exceeding 600 volts shall be placed within any building other than a central station or a sub-station.

c. The construction of an air-cooled transformer shall be such that when mounted on a plane surface the casing will make contact with such surface only at the points of support, providing elsewhere an air space of at least ¼ inch between casing and surface. If the surface is composed of combustible material, the air space shall be increased to at least 1 foot, unless a slab of non-combustible, non-absorptive insulating material is interposed.

This will require a slab of slate, marble or soapstone, somewhat larger than the transformer.

This section shall not be construed to apply to bell ringing and other signalling transformers, which operate at a primary voltage not exceeding 250 volts.

d. Transformer cases shall be grounded as provided in article 9 of this code.

ARTICLE 12. SWITCHES

1201. CONSTRUCTION OF KNIFE SWITCHES

a. A knife switch shall be deemed to be a switch having electrical connecting parts in the form of hinged or pivoted bars or blades and designed for manual operation.

b. Under the term knife switch shall be included single or multiple pole switches, either with or without fuse terminals, switches having individual bases designed for either front or rear wiring connections; also switch parts without separate bases intended for mounting on switchboards and panelboards.

c. Knife switches shall be plainly marked where the marking can be read after the switch is installed, with the current and the voltage for which the switch is designed. For switches of capacities above 1200 amperes, where the alternating current rating will generally be less than the direct current rating, the marking shall indicate the ampere rating definitely as A. C. or D. C. The frequency in cycles shall also be stated.

d. Pieces carrying or used to hold the break and hinge jaws shall be secured to the base or mounting surface in such a manner as to prevent possible turning.

e. The cross bar shall be secured to each blade in such a manner as to prevent turning and twisting.

f. The spacing given in Tables 1 and 2 below, shall be considered standard and as the minimum allowable, except as otherwise provided for in this article.

Table 1

Spacings between Parts of Opposite Polarity and Break Distances within the area bounded by contact parts of the switch mechanism.

Voltage	Amps.	Spacings—Inches		Fuses	Marking
		Opposite Polarity	Break Distance		
125 V. DC or AC For switchboards and panelboards only.	30	1	¾	With or Without	— A. 125V.
	60	1¼	1		
125 V. DC or AC	30	1¼	1	With or Without	— A. 125V.
	60	1½	1¼		
	100	1½	1¼		
	200 and *300	2¼	2		
	400 and 600	2¾	2½		
	800 to 6000 incl.	3	2¾		
250 V. DC or AC	30	1¾	1½	With or Without	— A. 250V.
	60	2¼	2		
	100	2¼	2		
	200 and *300	2½	2¼		
	400 and 600	2¾	2½		
	800 to 6000 incl.	3	2¾		
For both 250 V. DC and 500 V. AC	30	2¼	2	Without See also paragraph 270	— A. 250V. DC, 500V. AC.
	60	2¼	2		
	100	2¼	2		
	200 and *300	2½	2¼		
	400 and 600	2¾	2½		
	800 to 6000 incl.	3	2¾		
500 V. AC	Same as in IV			With	— A. 500V. AC.
600 V. DC or AC	30	4	3½	With or Without	— A. 600V.
	60	4	3½		
	100 to 6000 incl.	4½	4		

*The 300-ampere switches, with spacings of the 200-ampere switches, may be used only on switchboards.

Triple-pole switches with 125-volt spacings between blades for use on three-wire systems having 125 volts between adjacent wires and not over 250 volts between outside wires shall be spaced as in II of Table 1 and be marked ————A. 125V.

Triple-pole switches with 250-volt spacings between blades, for use on three-wire systems having 250 volts between adjacent wires and not over 500 volts between outside wires, shall be spaced as in III of Table 1, except 30-ampere fused switches to be spaced as in IV; they shall be marked ————A. 250V and if equipped with fuses, fuses shall be of the 600-volt classification.

Table 2

Spacing between Parts of Opposite Polarity outside the area bounded by the contact parts of the switch mechanism (except for Link Fuses).

When Mounted on Same Surface	When Clear of Surface
Not over 125 V. ¾ inch	½ inch
Not over 250 V. 1¼ inch	¾ inch
Not over 600 V. 2 inch	1 inch

It is recommended that switches above 1000 amperes capacity be not used to break currents, but only as disconnecting switches.

g. When fuse terminals are provided the spacings for such terminals shall conform to the requirements of article 8 of this code.

h. Switches rated above 600 amperes at 600 volts and 600 amperes at 250 volts, and therefore exceeding the capacities of standard sizes of cartridge enclosed fuses, may be arranged for fuses in multiple, provided as few fuses as possible are used, and the fuses are of equal capacity, and the multiple terminals for each pole are mounted in common.

i. Switches marked with combined rating, 250 volts, D. C. or 500 volts, A. C. shall not be provided with fuse terminals.

j. Switches having fuse terminals and intended for use in ungrounded branch circuits shall have fuse terminals in each pole.

k. Auxiliary contacts of a renewable or quick-break type or the equivalent shall be provided on all 600 volt switches designed for use in breaking currents from 200 to 1000 amperes, inclusive.

It is recommended that such auxiliary contacts be provided on all direct current switches rated at over 250 volts.

l. Barriers designed to be placed between the poles of switches and not located within the influence of the arc formed by the opening of the switch shall be of non-absorptive insulating material. Barriers placed between the poles of switches and located within the influence of the arc shall be of non-combustible, non-absorptive, insulating material.

m. Barriers designed to be placed between poles of switches at hinge jaws shall be of such size and so located as to provide a separation between contact parts measured in the shortest insulating surface path over the barrier equal to that required for switches without barriers, and to provide a separation between other current-carrying parts, as provided in paragraph f of this section.

n. Barriers placed between the poles of switches at the break jaws, and, therefore, located within the influence of the arc formed by the opening of the switch, shall be of such size and so located as to provide a separation between contact parts measured in the shortest path through air over the barrier equal to that required for switches without barriers.

o. Switches designed for double throw and having three or more poles, shall not have front-connected terminals for the hinge contacts of the inner poles unless standard switch spacings between adjacent live metal parts of opposite polarity are secured either by increased spacing between poles or by the use of barriers as provided for in paragraphs l, m and n, of this section.

1202. INSTALLATION OF SWITCHES; GENERAL

a. Switches shall not be placed where exposed to mechanical injury nor in the immediate vicinity of easily ignitable material, nor be located in places where combustible dust or flyings are liable to be present in the air in sufficient quantities to produce an explosive or flammable mixture. When the occupancy of the building is such that the above conditions cannot be complied with, switches, circuit breakers and similar devices, unless of the dust-tight, oil-immersed type shall be inclosed in approved metal boxes or cabinets and shall be of the externally operable type.

b. Switches shall always be placed in dry, accessible places, and be grouped as far as possible.

c. Switches when located where exposed to moisture as in basements and similar places, shall be mounted in approved boxes or cabinets, and when located in wet places or outside buildings shall be mounted in approved weatherproof switch boxes or cabinets.

1203. POSITION AND CONNECTION OF KNIFE SWITCHES

a. Single-throw knife switches shall be so placed that gravity will not tend to close them. Double-throw knife switches may be mounted so that the throw will be either vertical or horizontal as preferred, but if the throw be vertical a locking device shall be provided, so constructed as to insure the blades remaining in the open position when so set.

b. When practicable switches shall be so wired that blades will be dead when the switch is open.

It is recommended that up to 250 volts and thirty amperes, approved indicating snap switches, instead of knife switches, be used on lighting circuits.

1204. NUMBER OF POLES REQUIRED FOR SWITCHES

a. Single pole switches shall never be used as service switches, except as permitted in section 405 of this code, nor be placed in any neutral or grounded wire. Three-way and four-way switches shall be classed single-pole switches and shall be so wired that only one pole of the circuit will be carried to the switch.

b. On constant potential circuits, all service switches and all switches controlling circuits supplying current to motors or heating devices, unless otherwise provided in this code, shall be so arranged that the opening of the switch will disconnect all the ungrounded wires.

c. Where a circuit breaker serves as a switch, it shall conform to the requirements of this section as to the number of poles.

1205. MOUNTING OF SNAP SWITCHES AND FLUSH SWITCHES

a. Surface mounted snap switches shall be supported at outlets when possible by ⅞-inch blocks fastened between studs flush with back of lath, except when approved fittings or outlet boxes which will give proper support are used. When this cannot be done, base blocks not less than ¾ inch in thickness securely screwed to the lathing shall be provided.

b. Sub-bases of non-combustible, non-absorptive insulating material, which will separate the wires at least ½ inch from the surface wired over, shall be installed under all snap switches used in exposed knob and cleat work. Sub-bases shall also be used in raceway work; but they may be made of hardwood or they may be omitted if the switch is approved for mounting directly on the moulding.

c. Where flush switches or receptacles are used, whether with conduit systems or not, they shall be enclosed in an approved switch or outlet box constructed of iron or steel, in addition to the porcelain enclosure of the switch.

1206. SPECIAL TYPES OF SWITCHES

a. In central stations and sub-stations oil circuit breakers and switches shall wherever practicable be isolated from other switches and electrical apparatus.

b. Time switches, sign flashers and similar appliances shall be of approved design and enclosed in approved cabinets.

ARTICLE 13. SWITCHBOARDS AND PANELBOARDS

(This article does not apply to switchboards or portions thereof used exclusively to control signal circuits operated by batteries, but does apply to the charging panels where current is taken from light or power circuits.)

1301. SWITCHBOARDS: LOCATION AND ACCESSIBILITY

a. Switchboards shall be so placed as to reduce to a minimum the danger of communicating fire to adjacent combustible material.

b. Switchboards shall not be built up to the ceiling, a space of 3 feet being left, if possible, between the ceiling and the board. The space back of the board shall be kept clear of rubbish and shall not be used for storage.

c. Switchboards shall be accessible from all sides when the connections are on the back.

It is recommended that all switchboards be set out from the wall, but they may be placed against a brick or stone wall when the wiring is entirely on the face.

d. Switchboards shall be so located that they will not be exposed to moisture.

1302. SWITCHBOARDS: MATERIAL AND WIRING

a. The bases of switchboards shall be made of non-combustible material.

b. Busbars, if rigidily mounted, may be of bare metal.

c. If the wiring is on the back, there shall be a clear space of at least 18 inches between the wall and the apparatus on the rear of board.

d. Insulated conductors where closely grouped as in rear of switchboards shall each have a substantial flameproof outer covering.

e. Flameproofing shall be stripped back on all conductors a sufficient distance from the terminals to give the necessary insulation for the voltage of the circuit on which the conductor is used.

f. In wiring switchboards, the ground detector, voltmeter, pilot lights and potential transformers shall be connected to a circuit that is protected by 15 ampere fuses.

g. On switchboards where instruments, meters, or relays operate with windings or working parts, at a potential of 150 volts or above to ground, the cases and other exposed bare metal parts of these devices insulated from the current carrying parts shall be grounded unless isolated by elevation or protected by suitable insulating barriers or guards or where inaccessible to other than qualified persons, in which case grounding is required only when the voltage exceeds 750. The grounding conductor shall be not less than No. 12. Where instruments, meters or relays are operated from current or potential instrument transformers, the cases and other exposed bare metal parts which are insulated from the current carrying parts shall be grounded. The grounding conductor shall be not less than No. 12. If exposed to higher voltages through transformer windings or otherwise, secondary circuits of current and potential transformers of less than 750 volts shall be isolated or grounded unless placed in grounded conduit or other suitable duct, or identified and guarded as required for conductors of the highest voltage to which they are exposed. When a grounding conductor is used it shall be not smaller than the conductor of the secondary circuit.

1303. PANELBOARDS

a. The requirements of this section shall apply to all panel and distributing boards used for the control of light and power circuits, but not to such switchboards in central stations, sub-stations or isolated plants as directly control energy derived from generators or transforming devices.

b. Switches, fuses and cutout bases used on panelboards, shall conform to the requirements of articles 12 and 8, respectively, of this code, so far as they apply.

c. In the relative arrangement of fuses and switches, the fuses may be placed between the bus-bars and the switches, or between the switches and the circuits, except in the case of service switches, where the requirements of article 4 of this code shall be observed. When the branch switches are between the fuse and bus-bars, the connection shall be so arranged that the blades will be dead when the switches are open.

d. When there are exposed live metal parts on the back of board, a space of at least ½ inch shall be provided between such live metal parts and the cabinet in which the board is mounted.

e. The following minimum distances between bare live metal parts (bus-bars, etc.) shall be maintained.

Between parts of opp. pol. except as switches and link fuses.

When mounted on the same surface	When held free in air
Not over 125 volts ¾ inch	½ inch
Not over 250 volts 1¼ inch	¾ inch
Not over 600 volts 2 inch	1 inch

At switches or enclosed fuses, parts of the same polarity may be placed as close together as convenience in handling will allow.

At link fuses at not over 125 volts the spacings between parts of the same polarity shall be not less than ½ inch and at not over 250 volts, not less than ¾ inch.

These spacings are intended to prevent the melting of a link fuse by the blowing of an adjacent fuse of the same polarity.

The spacings given in the first column shall apply to the branch conductors where enclosed fuses are used. Where link fuses or knife switches are used, the spacings shall be at least as great as those prescribed in articles 8 and 12 respectively, of this code.

The spacings given in the second column shall apply to the distance between the raised main bars and between these bars and the branch bars over which they pass.

It should be noted that the above distances are the minimum allowable, and it is recommended that greater distances be adopted wherever the conditions will permit.

ARTICLE 14. FIXTURES, LAMP SOCKETS AND RECEPTACLES, PLUG RECEPTACLES AND OTHER OUTLET DEVICES

1401. CONSTRUCTION OF FIXTURES

a. Fixtures shall be composed of metal or wood, or such other material as may have been submitted for examination and approved. Materials other than metal shall be reinforced by metal or the fixtures shall be otherwise constructed to secure the requisite mechanical strength.

b. In all fixtures not made entirely of metal, wireways shall be lined with metal unless approved armored conductors with suitable fittings are used. This requirement shall not apply to wireways in glass, marble or similar non-absorptive, non-combustible insulating materials.

c. All methods of fastening arms, sockets, bodies, supports, and receptacles by threading, soldering, brazing or otherwise, shall be such as to secure in every case ample strength and reliability, and to prevent turning. Screw joints shall have not less than five threads engaging. Tubing used in making threaded arms and stems shall be composed of metal having a thickness not less than .04 inch. It shall not be kinked, flattened or cracked.

d. All burrs and fins in wireways shall be removed and all sharp edges rounded, where practicable, so that wires may be drawn in and withdrawn without injury. Fittings having smooth, rounded edges, shall be placed at entrance to casings of fixture stems.

e. Fixtures exposed to moisture, whether located indoors or outdoors, shall be so constructed that water cannot enter the wireways, sockets or other electrical parts.

f. Fixture studs which are not parts of outlet boxes, hickeys, tripods and crowfeet shall be made of malleable iron or other approved material.

g. All fixtures shall, where practicable, be sufficiently ventilated. All forms of fixtures in which the wiring is liable to be exposed to temperatures in excess of 120 degrees F. (49 degrees C.) shall be so designed or ventilated and installed as to operate at temperatures which will not cause deterioration of the wiring.

h. Canopies and outlet boxes or plates shall, taken together, provide ample space for the reception of the wires and their connecting devices.

i. Receptacles having exposed terminals shall not be placed in canopies unless completely enclosed in metal.

j. Canopy insulators, used where insulating joints are required, shall be of approved type and shall be securely fastened in place, so as to separate the canopies effectively and permanently from the conducting surfaces from which they are intended to be insulated.

A strip of a good grade of hard fiber, 1/16 inch in thickness, securely attached to the canopy at the ends and at intermediate points in such a manner that the strip will extend at least 3/16 inch beyond the upper edge of the canopy rim, will be accepted. Where this is impracticable, a flat sheet of said fiber, cut to conform to the general outline of the canopy and having the edges of the sheet at least flush with the edges of the canopy may be employed, if permanently attached to the canopy.

k. Insulating joints shall be composed of materials especially approved for the purpose. Those which are not designed to be mounted with screws or bolts shall have a substantial exterior metal casing, insulated from both screw connections.

1402. WIRING OF FIXTURES

a. No conductor shall be smaller than No. 18. On chains or other moveable parts stranded conductors shall be used, unless the wires are completely enclosed in metal. Where the fixture is externally wired, wires shall be secured in a manner which will not tend to cut or abrade the insulation, and shall be protected from abrasion where they pass

through sheet metal pans, canopies, etc. No splice or tap shall be located within an arm or a stem.

It is recommended that approved splicing devices or approved plug connections be used for attaching the fixture wires to the circuit wires.

b. Each fixture shall be so wired that all screw shells of sockets are connected to the same fixture stem wire or supply wire or terminal. A fixture stem wire or supply wire connected to the screw shells of sockets shall be identified by means of a white or natural gray covering, or by means of a tracer thread contrasting with the color of the covering, or by means of a band of paint contrasting with the color of the covering and located as near as possible to the point where the wire leaves the fixtures. If a white or natural gray covering is employed the covering of all other fixture stem or supply wires in the fixture shall be of a contrasting color. If a tracer thread is employed there shall be no such thread in the covering of any other fixture stem or supply wire. A terminal attached to the screw shells of sockets shall be marked in the manner specified in section 206 e to n of this code.

It is recommended that the wire connected to the screw shells be identified by means of a white or natural gray covering.

c. Chain fixtures shall be wired with flexible conductors so arranged that the weight of the fixture will not put tension on the conductors.

d. Approved fixture wire, approved flexible cord or approved rubber-covered wire shall be employed, unless the wiring is exposed to temperatures in excess of 120 degrees F. (49 degrees C.) in which case conductors having slow-burning or other heat-resisting covering shall be used. Fixtures intended for outdoor use shall be wired with approved rubber covered conductors. Wires shall always be so disposed as to avoid exposure to high temperatures as far as practicable. Fixtures intended for use in rooms where inflammable gases may exist shall consist of rigid stems, internally wired with approved rubber covered conductors, soldered directly to the circuit, and shall be equipped with vapor-tight globes.

e. Fixture wires or the individual conductors of flexible cords used where the voltage between any two conductors or between any conductor and the ground is over 300 volts, shall have insulation at least 3/64 inch in thickness for sizes No. 8 and smaller unless Type S cord is used.

f. Wires of different systems shall not be contained in or attached to a fixture; nor shall electric gas lighting wiring, other than for the frictional system, be attached thereto.

g. All wiring shall be free from short circuits and grounds, and shall be tested for these defects prior to being connected to the circuit.

1403. INSTALLATION OF FIXTURES

a. Straight electric fixtures shall be grounded except as described in 1 and 2 below.

1. Fixtures mounted on metal ceilings or side walls, or on walls or ceilings containing metal lathing, shall be grounded or shall be insulated from their supports by approved insulating joints or by approved insulating fixture supports, and canopy insulators shall be used.

2. Fixtures in open wiring, knob-and-tube work or wooden raceways and not on metal ceilings or side walls nor on plaster walls or ceilings containing metal lathing need be neither grounded nor insulated.

b. Fixtures shall be considered as grounded when mechanically connected in a permanent and effective manner to metal conduit, armored

cable or metal raceway systems or to a separate grounding wire not smaller than No. 14, or to gas piping which is grounded in the manner specified in article 9 of this code.

c. Combination gas and electric fixtures shall be insulated from their supports by approved insulating joints, placed as close as possible to the ceiling or wall, and canopy insulators shall be used.

d. Fixtures having so-called flat canopies, tops or backs shall not be installed where outlet plates are used.

It is recommended that for all sidewall and partition outlets in concealed work in new buildings under construction outlet boxes having a depth of approximately 1½ inches be used.

e. No externally wired fixture shall be located in the immediate vicinity of especially inflammable material; nor shall any externally wired fixture other than of the chain type be placed in a show window. Armored cord pendants shall be considered to be internally wired fixtures.

f. Where a gas pipe, outlet box, plate or other fitting which will provide proper support is required by this code or is present, the fixture shall be attached thereto; otherwise the fixture shall be attached to a ⅞-inch block fastened between studs or floor timbers and flush with the back of the lathing, or if this method cannot be employed a wooden base block not less than ¾ inch in thickness shall be provided.

g. Gas pipes shall be covered with insulating tubing back of the insulating joint or blind hickey. Where outlet tubes are used, they shall be of sufficient length to extend beyond the joint or hickey, and shall be firmly secured in place.

h. Fixtures shall be so installed that the connections between the fixtures and the branch circuit wires will be easily accessible for inspection without requiring the disconnecting of any portion of the wiring, unless the fixture is attached by an approved plugging device.

1404. LAMP SOCKETS AND RECEPTACLES

a. Lamp holding devices shall be classed according to diameters of lamp bases, as candelabra, medium and mogul base, to be known respectively as ½ inch, 1 inch and 1½ inch nominal sizes, with ratings as specified in the table following this paragraph. Switched sockets shall be of such construction that the switching mechanism interrupts the electrical connection to the center contact. The switching mechanism shall not interrupt the electrical connection to the screw shell unless connection to the center contact is simultaneously interrupted. This requirement shall become effective September 1, 1926.

		Ratings					
				Key			Keyless
				Max. amp. at any volt-			Max. amp. at any volt-
Class	Nominal Diam.	Watts	Volts	age	Watts	Volts	age
Candelabra	½ in.	75	125	¾	75	125	1
Medium	1 in.	250	250	2½	660	250	6
	(*a*)	660	250	6	660	600	
Mogul	1½ in.				1500	250	
	(*b*)				1500	600	

(*a*) This rating may be given only to sockets having a switch mechanism which produces both a quick "make" and a quick "break" action.

(*b*) Ratings to be assigned later, pending further discussion with manufacturers.

Miniature sockets and receptacles having screw shells smaller than the candelabra size may be used for decorative lighting systems, Christmas tree lighting outfits, and similar purposes.

For exceptions for medium base key sockets and receptacles see article 40, Small Isolated Plants.

It is recommended that 660 watt sockets and receptacles be used wherever the attachment of flexible cords thereto is likely.

Receptacles for attachment plugs (appliance and convenience outlets) are strongly recommended in order to facilitate the use of electrical appliances which, otherwise, must be connected to sockets designed primarily only for lamp holders.

b. The inside of metal shells shall be lined with insulating material, which shall absolutely prevent the shell from becoming a part of the circuit, even though the wires inside the sockets should become loosened or detached from their position under the terminal screws.

c. The lining shall not extend beyond the metal shell more than ⅛ inch, but shall prevent any current-carrying part of the lamp base from being exposed when a lamp is in the socket.

d. The cap also shall be lined.

In sockets and receptacles of standard forms a ring of any material inserted between an outer metal shell of the device and the inner screw shell for insulating purposes and separable from the device as a whole, is considered an undesirable form of construction. This does not apply to the use of rings in lamp clusters or in devices where the outer shell is of porcelain, where such rings serve to hold the several porcelain parts together, and are thus a necessary part of the whole structure of the device.

e. The socket as a whole shall be so put together that parts will not rattle loose or fall apart under the most severe conditions they are likely to meet with in practice. The base of the socket shall be secured or held in the shell in such a manner as to prevent turning or displacement relative to the shell.

f. Lead wires furnished as a part of sockets and intended to be exposed after installation shall be of approved stranded, rubber-covered wire, not less than No. 14 gauge (No. 18 gauge for candelabra sockets), and shall be sealed in place.

g. If the socket is not attached to a fixture, the inlet shall be equipped with an approved insulating bushing which, if threaded, shall be not smaller than ⅜ inch in size. The edges of bushings shall be rounded and all inside fins removed in order to provide a smooth bearing surface for the wire.

It is recommended that bushings having holes 9/32 inch in diameter be employed with plain pendant cord, and holes 13/32 inch in diameter with reinforced cord.

h. In places where combustible dust or flyings are liable to be present in the air in sufficient quantities to produce an explosive or inflammable mixture, dust-tight fixtures enclosing lamps and sockets shall be used. Such fixtures shall be supported by conduit hangers or chains to prevent any strain on the wires. Where rubber-covered wire is used it shall have insulation not less than 3/64 inch thick.

i. Sockets and receptacles installed over specially inflammable material shall be of the keyless type and, unless individual switches are provided, shall be located at least 7½ feet above the floor, or shall be otherwise so located or guarded that the lamps cannot readily be backed out by hand.

j. When necessary to prevent portable lamps from coming into contact with inflammable materials, or to protect them from breakage, their flexible cord leads shall be equipped with handle socket and substantial guard, the guard being securely attached to socket or handle.

k. Weatherproof sockets, especially approved for the location, shall be employed in damp or wet places or where corrosive vapors exist. If not attached to fixtures, they shall be hung from separate stranded wires not less than No. 14 which are soldered directly to the circuit wires but supported independently thereof.

It is recommended that these wires be twisted together, if the pendant is longer than 3 feet.

l. Receptacles shall be supported in the same manner as specified for fixtures in section 1403-f of this code.

m. Flush receptacles shall be inclosed in approved metal boxes in addition to the insulating inclosure of the receptacle mechanism.

n. Attachment plugs and receptacles located in floors shall be inclosed in approved metal boxes especially designed for the purpose. Where the location is free from mechanical injury or moisture, a departure from this requirement may be permitted by the inspection department.

o. Receptacles of the Edison base type shall be located not less than four feet from the floor unless for use only as lamp holding devices.

1405. ROSETTES

a. When designed for use with exposed wiring, rosettes shall be provided with bases which shall have at least 2 holes for supporting screws, shall be high enough to keep the wires and terminals at least ½ inch from the surface wired over, and shall have a porcelain lug under each terminal to prevent the rosette being placed over projections which would reduce the separation to less than ½ inch.

b. When designed for use with conduit boxes or wire raceways, rosette bases shall be high enough to keep wires and terminals at least ⅜ inch from the surface wired over.

c. Fuseless rosettes shall be rated at 660 watts, 250 volts, with a maximum current rating of 6 amperes.

d. Fused rosettes shall not be used.

ARTICLE 15. LAMPS

1501. ARC LAMPS

a. Arc lamps shall be equipped only with such resistances or regulators as are enclosed in non-combustible cases, said resistances or regulators being treated as sources of heat. An incandescent lamp shall not be used as resistance or regulator. Economy and compensator coils shall be mounted on non-combustible, non-absorptive insulating supports, such as glass or porcelain, providing an air space of at least 1 inch between frame and support. Such coils shall generally be treated as sources of heat.

b. Arc lamps shall be equipped with globes and spark arresters. The globe shall be guarded by a wire netting having a mesh not exceeding 1¼ inches. The globe, netting and spark arrester shall not be required where the lamp is of enclosed arc type.

c. Outdoor arc lamps shall be suspended at least 8 feet above the sidewalk. Indoor arc lamps shall be hung out of reach, or be suitably protected.

d. Leads to arc lamps shall have a current carrying capacity approximately 50 per cent. in excess of the normal current of the lamp. If the leads are larger than No. 14 and the lamp suspension provides for raising and lowering, the leads shall be composed of stranded wires.

e. There shall be provided a cutout for each lamp or series of lamps.

1502. MERCURY VAPOR LAMPS

a. Enclosed mercury vapor lamps shall be equipped with only such resistances or regulators as are enclosed in non-combustible cases, such resistances or regulators being treated as sources of heat. Where these resistances or regulators are subject to flyings of lint or combustible material, all openings in their casings shall be covered by fine wire gauze.

b. A cutout shall be provided for each enclosed mercury vapor lamp or series of lamps, except where not more than five lamps are contained in a single frame and lighted by a single operation. By permission of the inspection department, lamps may be so grouped that not more than 4000 watts will be dependent upon one cutout.

c. Fixures carrying enclosed mercury vapor lamps shall be wired with insulated conductors not smaller than No. 12. Taps from circuit wires to points of suspension of fixtures shall not exceed 18 inches in length.

1503. GAS-FILLED INCANDESCENT LAMPS

a. Gas-filled incandescent lamps shall not be equipped with medium bases if above 250 watts rating, nor with mogul bases if above 1500 watts rating. They shall not be located in show windows nor where liable to contact with inflammable material unless installed in approved fixtures equipped with shades or guards or suitably designed to operate at a safe temperature.

b. Indoor fixtures carrying gas-filled incandescent lamps shall be wired with conductors having approved heat-resisting insulation. Outdoor fixtures shall be wired with conductors having approved rubber covering.

ARTICLE 16. ELECTRICALLY HEATED APPLIANCES

1601. EXCEPTION

a. This article shall be construed to apply only to electrically heated appliances intended for use on circuits operating at a potential exceeding 50 volts.

1602. GENERAL

a. Each electrically heated appliance shall be provided with a nameplate, giving the maker's name and the normal capacity in volts and amperes or in volts and watts.

b. Each smoothing iron, sadiron and other portable electrically heated appliance, which is intended to be applied to combustible material, shall be equipped with an approved stand.

It is strongly recommended that each such electrically heated appliance or group of electrically heated appliances be used with an approved signal or with an approved protective device.

c. Wires supplying smoothing irons, sadirons and all portable electrically heated appliances requiring more than 250 watts shall conform to the requirements for heater cord, as prescribed in section 603, article 6 of this code. Wires supplying stationary electrically heated appliances shall

conform to the requirements for rubber-covered wire, as prescribed in section 602, article 6 of this code; provided, however, that heat-resisting covering shall be used in place of rubber where wires outside the terminal box are subjected to a temperature in excess of 120 degrees F. (49 degrees C).

d. Electrically heated appliances each of 6 amperes or 660 watts or less may be used on branch lighting circuits. Electrically heated appliances each of 1320 watts or less may be grouped on a separate branch circuit equipped only with approved plug receptacles and not with lamp sockets. This separate branch circuit shall be protected by fuses having a rated capacity not greater than 15 amperes.

e. Each complete electrically heated appliance, whether containing one or more heating elements which is of more than 1320 watts total capacity shall be supplied by a separate branch circuit and shall be controlled by an indicating switch readily accessible, which switch shall disconnect all ungrounded wires supplying the appliance.

f. Switches controlling the individual units of electric ranges, etc., shall not be considered as taking the place of the switch required by paragraph e of this section, but an approved attachment plug and receptacle may serve in lieu of the switch.

g. Portable electrically heated appliances having a capacity not exceeding 6 amperes or 660 watts may be connected individually to lighting circuits.

h. Subdivided circuits of electrically heated appliances need not be separately fused, but individual heating elements of such electrically heated appliances shall be used if they are rated at more than 30 amperes.

i. Each portable electrically heated appliance shall be equipped with an approved plug connector so designed that the plug may be pulled out to open the circuit without leaving any live parts so exposed as to render likely accidental contact therewith. The connector may be located at either end of the flexible conductor or inserted in the conductor itself.

1603. STATIONARY ELECTRICALLY HEATED APPLIANCES

a. Each electrically heated appliance which is obviously intended by size, weight and service to be secured in a fixed position shall be so placed as to furnish ample protection between the appliance and adjacent combustible material.

b. Metal frames of stationary electrically heated appliances, operating on circuits above 150 volts to ground shall be grounded; provided, however, that where this is impracticable, grounding may be omitted by permission of the inspection department, in which case the frame shall be permanently and effectively insulated.

It is recommended that the frame be grounded in all cases.

c. Wires supplying stationary electrically heated appliances shall, if not in conduit, be so located as to be protected from mechanical injury and moisture.

It is recommended that conduit be employed.

ARTICLE 17. RESISTANCE DEVICES

1701. CONSTRUCTION

a. Rheostats, resistance boxes and equalizers intended for use in dusty or linty places or where exposed to flyings of combustible material shall be so constructed as to confine and quickly extinguish any arc or flame caused by the burning out of the resistive conductor and shall

be equipped with dustproof face plates. For locations other than those above specified, these devices may be of any approved type.

b. Reactance coils shall be composed of non-combustible material, mounted on non-combustible bases and treated generally as sources of heat.

c. Condensers shall be provided with non-combustible cases and supports, and shall be installed in the manner provided for other apparatus operating with equivalent voltages and currents.

d. Resistance devices shall be so constructed that when mounted on a plane surface the casing will make contact with such surface only at the points of support, an air space of at least ¼ inch being maintained between the casing and the surface.

e. The terminals of motor-starting rheostats shall be marked to indicate the part of the circuit to which each terminal is to be connected, as "line," "armature" and "field."

f. Fixed and movable contacts shall be so designed and so connected to the resistive conductor that there will be a minimum of arcing and consequent roughening of the contacts, even with careless handling or in the presence of dirt. In motor starting rheostats, the point or plate on which the arm rests when in the starting position shall have no electrical connection with the resistive conductor.

g. Motor-starting rheostats shall be so designed that the contact arm cannot be left on intermediate segments. Such rheostats, if intended for use on direct current circuits, shall be equipped with automatic devices which will interrupt the supply before the speed of the motor has fallen to less than one-third its normal value.

h. Where insulated wire is used for connections between resistance elements and the contact device of a rheostat, except for motor starting service, the insulation shall be of the slow-burning type. For large rheostats and similar resistances where the contact devices are not mounted upon them the connecting wires having slow-burning insulation may be so arranged in groups that the maximum difference of potential between any two wires in any group shall not exceed 75 volts. Each group of wires shall either be mounted on non-combustible, non-absorptive insulators giving at least ½ inch separation from the surface wired over, or, especially where it is necessary to protect the wires from mechanical injury, each group of wires may be encased in flexible tubing and placed in approved conduit, the flexible tubing extending at least 1 inch beyond the ends of the conduit.

1702. INSTALLATION

a. Resistance devices shall be placed on a switchboard, or at a distance of at least 1 foot from combustible material, or shall be separated therefrom by a slab or panel of non-combustible, non-absorptive material, such as slate, soapstone or marble. This slab shall be somewhat larger in area than the resistance device and shall be secured in position by its own supports which shall be independent of those fastening the resistance device to the slab. Bolts which support the resistance device shall be countersunk at least ⅛ inch below the rear surface of the slab and shall be covered with insulating material. The slab shall have a thickness proportioned to the size and weight of the resistance device, in order to provide proper mechanical strength, and this thickness shall be not less than ½ inch.

b. Where exposed live parts of an autotransformer starter are liable to accidental contact, a railing shall be placed around them.

1703. LAMP RESISTANCES

a. Where protective resistances are necessary in connection with automatic rheostats, incandescent lamps may be used, provided they do not carry or control the main current nor constitute the regulating resistance of the device.

b. When used as resistance, lamps shall be mounted in porcelain receptacles attached to non-combustible supports and shall be so arranged that they cannot have impressed upon them a voltage greater than that for which they are rated. They shall in all cases be provided with a name-plate, which shall be permanently attached beside the porcelain receptacle or receptacles and stamped with the wattage and voltage of the lamp or lamps to be used in each receptacle.

c. Incandescent lamps may be used for the purpose of resistances in series with other devices, by permission of the inspection department and when mounted in porcelain receptacles upon non-combustible supports and when so arranged that they cannot have impressed upon them a voltage greater than that for which they are rated.

ARTICLE 18. STORAGE OR PRIMARY BATTERIES

1801. GENERAL

a. Wiring and appliances supplied by storage or primary batteries shall be subject to the general requirements of this code which apply to wiring and appliances fed from generators developing the same difference of potential.

For battery installations for small isolated plants of less than 50 volts, see article 40 of this code.

1802. SPECIAL REQUIREMENTS

a. The battery room shall be thoroughly ventilated.

b. Wiring shall be exposed, and shall be installed in accordance with the requirements of section 501 of this code, except that in battery rooms, varnished cloth or tape insulations on conductors shall not be permitted.

c. Storage batteries shall be mounted on non-absorptive, non-combustible insulators, such as glass or thoroughly vitrified glazed porcelain.

d. Metal susceptible to corrosion unless suitably protected against attack from acid or acid spray, shall not be employed in the cell connections of storage batteries.

ARTICLE 19. LIGHTNING ARRESTERS

1901. IN STATIONS

a. A lightning arrester shall be connected to each overhead wire entering a station.

b. Lightning arresters shall be located in readily accessible places, away from combustible materials and as near as practicable to the point where the wires enter the station.

c. Lightning arresters shall be well isolated from other equipment and, if of the oil-filled type, shall be placed in a fireproof room or compartment.

d. Lightning arresters shall be grounded as provided in article 9 of this code.

e. All choke coils, or other attachments inherent to the lightning protection equipment, shall have an insulation from the ground or other conductors at least equal to the insulation required at the points of the circuit in the station.

f. Kinks, coils and sharp bends in the wires between arresters and outdoor lines shall be avoided as far as practicable.

1902. RADIO EQUIPMENT

See article 37.

1903. SIGNAL SYSTEMS

See article 60.

1904. GROUNDING

See section 903.

ARTICLE 30. CRANES AND HOISTS

3001. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

3002. WIRES

a. Wires, other than bare collector wires, shall be of approved rubber-covered or of approved slow-burning type.

b. Rubber-covered wire shall be not smaller than No. 12.

c. Slow-burning wire shall be employed only between resistance and contact plates of rheostats or where exposed to severe external heat. Wires between resistances and contact plates shall conform to the requirements of section 1701, paragraph h, of this code, except that such wires, if exposed to moisture, shall be of the rubber-covered type.

3003. INSTALLATION OF WIRES

a. Exposed wiring, other than collector wires, shall be supported 1 inch from the surface wired over 2½ inches apart for voltages up to 300, and 4 inches apart for voltages between 301 and 600; provided, however, that in dry places where space is limited each wire may be separately encased in approved flexible tubing securely fastened in place.

3004. COLLECTOR WIRES

a. Collector wires shall be secured at the ends by means of approved strain insulators, and shall be so mounted on approved insulators that the extreme limit of displacement of the wire will not bring the latter within less than 1½ inches from the surface wired over.

b. Main collector wires carried along runways shall be rigidly and securely attached to insulating supports placed at intervals not exceeding 20 feet. When run horizontally, such wires shall be separated not less than 6 inches; when run otherwise, not less than 8 inches. Where necessary, intervals between insulating supports may be increased up to 40 feet, the separation between wires being increased proportionately.

c. Bridge collector wires shall be kept at least 2½ inches apart and, where the span exceeds 80 feet, insulating saddles shall be placed at intervals not exceeding 50 feet.

It is recommended that the distance between wires be greater than 2½ inches, where practicable.

d. Sizes of collector wire shall conform to the following table:

Distance between rigid supports	Size of wire
0—30 feet	No. 6
31—60 "	No. 4
over 60 "	No. 2

3005. COLLECTORS

a. Collectors shall be so designed as to reduce to a minimum the sparking between them and the collector wire.

3006. SWITCHES AND CUTOUTS

a. The main collector wires shall be protected by a cutout, and the circuit shall be controlled by a switch. The cutout and switch shall be so located as to be readily accessible from the floor.

b. Where cranes are operated from cabs, the cutout and switch specified in paragraph a of this section shall be inserted in the leads from the main collector wires, and shall be so located in the cab as to be readily accessible to the operator.

c. Where more than one motor is employed on a crane, each motor with its leads shall be separately protected by a cutout in accordance with the provisions of articles 8 and 10 of this code; provided, however, that where two motors operate a single hoist, carriage, truck or bridge and are controlled as a unit by one controller, the pair of motors with their leads may be protected by a single cutout. This cutout shall be located in the cab if there is one.

3007. CONTROLLERS

a. If the crane operates over readily combustible material, the resistances shall be placed in a well ventilated cabinet composed of non-combustible material, so constructed that it will not emit flame or molten metal.

If the resistances are located in a cab, this requirement may be met by constructing the latter of non-combustible material enclosing the sides of the cab from the floor to a point at least 6 inches above the tops of the resistances.

3008. GROUNDING

a. Motor frames, tracks and the entire frame of the crane shall be grounded as prescribed in article 9 of this code.

ARTICLE 31. ELEVATORS

3101. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

Both Bell and Keystone telephone numbers make the Classified Building Trade Directory of still greater service.

3102. WIRES AND CABLES

a. The flexible or traveling cables of the operating and lighting circuits shall be of approved rubber-covered types, and shall have a substantial flameproof outer covering. They may be run in properly bush approved conduit where attached to the car, or may be run exposed and attached directly to the outer surface of the car extending thence to switches or fixtures within the car.

b. Conductors for lighting cables shall be not smaller than No. 14, and for control cables not smaller than No. 16.

c. Conductors, other than lighting and control cables, where located in shafts shall be encased in approved conduit or armor. Split tees and elbows may be used on conduit work except where the pipe contains feeders.

d. Signal wires, other than those receiving energy from primary batteries or approved bell transformers, shall be encased in approved conduit equipped with approved terminal bushings having an individual outlet hole for each wire.

e. The wires of motor circuits between motors and control panel may be grouped together without any extra insulation of the separate wires provided the complete group is either taped or corded and painted in a manner to make same a rigid, self-supporting form, not over 3 feet long and not in a position liable to mechanical damage or subject to a temperature in excess of 120 degrees F. (49 degrees C.).

f. All wires between main circuit resistances and the back of control panels shall each have a flameproof outer covering as prescribed in section 1701, paragraph h, of this code. All other wiring on control panels may be of the rubber-covered type, provided the wires are laid flat against the panel and held in such a manner as to be immovable, and free from mechanical injury, and are not subjected to a temperature exceeding 120 degrees F. (49 degrees C.).

In a few cases it may be necessary to bunch wires of the operating circuit on the rear of the control panel. This is permitted, provided the wires are taped, and painted with an insulating paint.

3103. SWITCHES

a. A switch disconnecting all ungrounded wires of the motor circuit shall be located within sight of the motor, unless permission to locate it elsewhere is given by the inspection department.

b. In garages, hatch limit switches and other spark-emitting devices shall be placed at least 4 feet above the line of the lowest floor level.

3104. GROUNDING

a. Conduit or armored cable attached to elevator cars need not be grounded.

b. Motor and motor generator sets mounted on metal beams which form part of the structural metal frame of a building shall be deemed to be grounded.

c. The shifting cable need not be grounded if provided with approved strain insulators.

ARTICLE 32. EXTRA-HAZARDOUS LOCATIONS

3201. GENERAL

a. Extra-hazardous locations shall comprise rooms or compartments in which highly inflammable gases, liquids, mixtures or other substances are manufactured, used or stored in other than original containers.

b. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

See also:
Service equipment, section 406, par a.
Fuses and circuit-breakers, section 805, par. h.
Motors and control, section 1003, par. c; section 1004, par. b.
Switches, section 1202, par. a.
Lamps and receptacles, section 1404, pars. h, i and j.
Resistance devices, section 1701, par. a.

3202. WIRING

a. Armored cable or conduit shall be employed as the wiring method.

3203. ENCLOSURE OF LAMPS AND DEVICES

a. Lamps shall be inclosed in guarded vaporproof globes.

b. Devices and apparatus which tend to create sparks or arcs and thus ignite the highly inflammable contents shall not be placed in extra-hazardous locations unless such devices and apparatus are of the totally enclosed type, especially approved for the location.

3204. SPECIAL PRECAUTIONS

a. Switches and motors shall not be located under any hood or in any vent pipe.

ARTICLE 33. GARAGES

3301. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. A garage shall be deemed to be a building or portion of a building in which one or more self-propelled vehicles carrying volatile, inflammable liquid for fuel or power are kept for use, sale, storage, rental, repair, exhibition or demonstration purposes, and all that portion of a building which is on or below the floor or floors on which such vehicles are kept and which is not separated therefrom by tight, unpierced fire walls and fire resistive floors.

3302. WIRING

a. Where floor area is sufficient to permit the storage of more than two vehicles, approved conduit or approved armored cable shall be employed as the wiring method; provided, however, that approved metal moulding may be employed in offices and show rooms. Where

the floor space will accommodate not more than two vehicles, any approved wiring method may be employed.

b. Outlet and junction boxes shall be located at least 4 feet above the floor.

c. Approved reinforced cord shall be used for pendant lamps.

3303. PORTABLES

a. Approved portable cord designed for rough usage, such as hard service cord, stage cable or packinghouse cord, shall be used to connect portable lamps, motors or other appliances. The portable cord shall carry the male end of an approved pin-plug connector, or equivalent, the female end being of such design or so hung that the connector will break apart readily at any position of the cable. The connector shall be kept at least 4 feet above the floor.

b. Portable lights shall be equipped with approved keyless sockets of moulded composition or metal-sheathed porcelain type, the socket being provided with handle, hook and substantial guard.

3304. CHARGING CABLES

a. Approved stage cable shall be used for charging purposes.

b. Connectors shall be of approved type and of at least 50 amperes capacity, and shall be so designed or so hung that at least one will break apart readily at any position of the cable. Live parts shall be guarded from accidental contact. The fixed, or wall, connector shall be kept at least 4 feet above the floor and if not located on a switchboard or charging panel, shall be guarded from accidental contact.

3305. SWITCHBOARDS AND CHARGING PANELS

a. Where spark producing devices are not located at least 4 feet above the floor, or placed in vaporproof enclosures, switchboards and charging panels shall be located in a room or inclosure provided for the purpose.

3306. GENERATORS AND MOTORS

a. Generators or motors which do not actually form part of the vehicle equipment shall be of the totally enclosed type, or located at least 4 feet above the floor. When the motor is located more than 4 feet above the floor and is not of the totally enclosed type, it shall be equipped with wire screens of not less than No. 14 mesh, placed over openings at the commutator end.

3307. SPECIAL PRECAUTIONS

a. Cutouts, switches and receptacles shall be placed at least 4 feet above the floor. Cutouts and switches attached to portable apparatus shall be placed in approved cabinets.

b. Cutouts and switches shall be enclosed in approved boxes or cabinets unless placed on switchboards or charging panels in the manner prescribed in section 3305 of this code.

c. Hatch limit switches of elevators shall be located at least 4 feet above the lowest floor level.

ARTICLE 34. MOTION PICTURE STUDIOS

3401. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. A motion picture exchange, factory, laboratory or studio shall be deemed to be that building or portion of a building in which moving picture films are manufactured, exposed, developed, printed, rewound, repaired, stored, etc.

3402. WIRING

a. Approved conduit, metal raceway or armored cable shall be employed as the wiring method.

b. Side wall lamp outlets shall consist of receptacles enclosed in approved outlet boxes equipped with open-end guards riveted to the covers of the boxes.

c. Pendant lamps shall be suspended by means of approved reinforced cords, armored cord or armored cable and shall be protected by substantial wire guards.

d. Each portable lamp shall be composed of approved hard service flexible cord, approved composition or approved metal-sheathed porcelain keyless socket, handle, hook and substantial guard. The cord shall carry the male end of an approved pin-plug connector or equivalent, the female end being of such design or so hung that the connector will break apart readily at any position of the cord. The connector shall be kept at least 1 foot above the floor.

e. At patching tables, approved composition or metal-sheathed porcelain keyless sockets shall be employed and shall be equipped with suitable means to guard lamps from mechanical injury.

f. In film-storage vaults, lamps shall be installed on rigid fixtures and inclosed in vaporproof globes. Such lamps shall be controlled by a double pole switch, located outside the vault. Electric motors or portable lamps shall not be placed in the vault.

g. Motors shall be of the enclosed type. Rheostats shall be placed in cabinets which enclose all live parts, leaving only the operating handles exposed.

ARTICLE 35. MOTION PICTURE PROJECTORS AND EQUIPMENT

3501. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. The so-called professional types of projectors, such as are commonly used in theatres and motion picture houses, shall be located in fireproof booths.

The professional projector employs a film which is 1⅜ inches wide and has on each edge 5.4 perforations per inch.

c. Projectors of the non-professional or miniature type, if employing only approved slow-burning (cellulose acetate or equivalent) film, may be operated without a booth.

3502. PROJECTORS OF PROFESSIONAL TYPE

a. The arc lamp house shall be composed entirely of metal having a thickness not less than No. 24 U. S. sheet metal gauge (.025 inch) except where the use of approved insulating material is necessary. Details of construction shall conform to the requirements of section 1501 of this code. An incandescent lamp inclosure shall conform to the above requirements so far as may be practicable.

b. Wires not smaller than No. 4 shall be employed to supply the projector outlet.

c. Rheostats. transforming devices and any substitute therefor, shall be of types, expressly designed and approved for the purpose. They shall be judged as component parts of the projector equipment as to installation and location.

d. Top and bottom magazines shall be so designed in some approved manner as to prevent the entrance of flame. No solder shall be used in their construction. The front side of each magazine shall consist of a door swinging horizontally and equipped with a substantial latch.

e. An automatic shutter shall be provided and permanently attached to the gate frame. The construction of the shutter shall be such as to shield the film from the beam of light whenever the film is not running at operating speed.

f. Motor-driven projectors shall be of a type expressly designed and approved for such operation. Such projectors shall be used only by permission of the inspection department, and when the projector is in charge of a qualified operator.

3503. ENCLOSURES FOR PROJECTORS OF PROFESSIONAL TYPE

a. The enclosure shall be constructed of suitable fireproof material, shall be properly lighted and shall be large enough to permit the operator to walk freely on either side of or back of the projector.

b. Ventilation shall be provided by means of a vent pipe having a cross-sectional area of not less than 78 square inches, and such vent pipe shall lead to the outside of the building or to a special non-combustible flue. The vent pipe shall be kept at least 1 inch from combustible material or separated therefrom by approved non-combustible, heat-insulating material not less than ½ inch in thickness.

c. Draft in vent pipe shall be maintained by an exhaust fan having a capacity of at least 50 cubic feet per minute. The fan motor shall be so installed that fumes passing through the flue cannot come in contact with it, shall be connected to the emergency service and shall not be controlled from the booth.

d. Openings in the enclosure shall be equipped with doors or shutters of fire-resisting material equivalent to that of the enclosure. Such door or shutter shall entirely close its opening, and shall be arranged to be held in the closed position by spring hinges or equivalent devices.

e. Rewinding of films shall be performed in the enclosure if practicable; otherwise, in a separate fireproof room provided for the purpose. Extra films shall be kept in individual metal boxes having tight-fitting covers. Reels carrying films under examination or in process of rewinding shall be enclosed in magazines or approved metal boxes similar to those of the projector, and not more than 2 feet of film shall be exposed.

f. A motor-generator installed in the projector enclosure shall have the commutator end or ends suitably protected from mechanical injury by wire screens or other suitable means.

3504. PROJECTORS OF NON-PROFESSIONAL TYPE

a. Motion picture projecting machines not intended for installation and use in permanent and ventilated booths shall be permitted only for projecting film of an approved slow-burning (cellulose acetate or equivalent) type.

b. All such equipment shall be expressly approved, including current-controlling devices and other essential operating parts.

c. The source of illumination of the projected view shall be an incandescent lamp of a pattern expressly intended for stereopticon use or for motion picture projection.

d. Rheostats, transformers, switches and other current controlling devices shall be attached to and form an integral part of the projector or its housing and shall have no live parts exposed.

e. The slow-burning (cellulose acetate or equivalent) film shall have a permanent distinctive marker for its entire length identifying the manufacturer and the slow-burning character of the film stock.

f. Machines shall be marked with the name or trade-mark of the maker, and with the voltage and current rating for which they are designed, and shall also be plainly marked, "For use with slow-burning films only."

ARTICLE 36. ORGANS

3601. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19 inclusive, of this code. They shall be deemed to apply to those electrical circuits and parts of electrically operated organs which are employed for the control of the sounding apparatus and keyboards.

3602. SOURCE OF ENERGY

a. The source of energy shall be either a self-excited generator rated at not over 15 volts, or a primary battery.

b. The generator shall either be permanently and effectively insulated both from ground and from the motor driving it, or both generator and motor frames shall be grounded as prescribed in article 9 of this code.

3603. CABLES

a. All wires, except common return wires inside the organ proper, the organ sections and the organ console, shall be cabled.

b. The separate wires of the cable shall be not smaller than No. 26, and shall have either rubber, cotton or silk insulation. The cotton or silk may be saturated with paraffine, if desired.

c. The separate wires shall be either bunched or cabled. In either event they shall be enclosed in one or more braided outer coverings. A tape may be substituted for an inner braid. The outside covering of a cable not run in conduit shall either be flameproof, or covered with a closely wound fireproof tape.

d. The common return wire shall be not smaller than No. 14, shall be of either the rubber-covered or the slow-burning type and shall not be contained in the cable. It may be run in contact with the cable or placed under an additional covering inclosing both cable and return wire.

3604. WORKMANSHIP AND MATERIAL

a. All wiring and devices within the organ or any of its parts shall be neatly disposed and securely fastened.

It is not found to be either necessary or feasible in organ structures to require the use of non-combustible, non-absorptive insulating material for the supports or enclosures of current carrying parts.

b. Cables between parts of the organ and between the console and the organ shall be installed in a workmanlike manner, shall be securely fastened in position and shall be kept from contact with other wires. Conduit may be used, but shall not be required.

3605. FUSES

a. Circuits shall be so subdivided and protected at the source by approved enclosed fuses of not over 30 amperes rating that every wire will be protected by one or more such fuses. No other fuses in the organ circuits shall be required.

ARTICLE 37. RADIO EQUIPMENT

3701. GENERAL

a. The requirements of this article shall not apply to equipment installed on shipboard, but shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. Transformers, voltage reducers, keys and other devices employed shall be of types expressly approved for radio operation.

3702. FOR RECEIVING STATIONS ONLY

a. Antenna and counterpoise outside buildings shall be kept well away from all electric light or power wires of any circuit of more than 600 volts, and from railway, trolley or feeder wires, so as to avoid the possibility of contact between the antenna or counterpoise and such wires under accidental conditions.

b. Antenna and counterpoise where placed in proximity to electric light or power wires of less than 600 volts, or signal wires, shall be constructed and installed in a strong and durable manner, and shall be so located and provided with suitable clearances as to prevent accidental contact with such wires by sagging or swinging.

c. Splices and joints in the antenna span shall be soldered unless made with approved splicing devices.

d. The preceding paragraphs, a, b, and c, shall not apply to light and power circuits used as receiving antenna, but the devices used to connect the light and power wires to radio receiving sets shall be of approved type.

e. Lead-in conductors shall be of copper, approved copper-clad steel or other metal which will not corrode excessively, and in no case shall they be smaller than No. 14, except that bronze or copper-clad steel not less than No. 17 may be used.

f. Lead-in conductors on the outside of buildings shall not come nearer than 4 inches to electric light and power wires unless separated therefrom by a continuous and firmly fixed non-conductor which will maintain permanent separation. The non-conductor shall be in addition to any insulating covering on the wire.

g. Each lead-in conductor shall enter the building through a non-combustible, non-absorptive, insulating bushing slanting upward toward the inside or by means of an approved device designed to give equivalent protection.

h. Each lead-in conductor shall be provided with an approved protective device (lightning arrester) which will operate at a voltage of 500 volts or less, properly connected and located either inside the building at some point between the entrance and the set which is convenient to a ground, or outside the building as near as practicable to the point of entrance. The protector shall not be placed in the immediate vicinity of easily ignitable stuff, or where exposed to inflammable gases or dust or flyings of combustible materials.

i. If an antenna grounding switch is employed, it shall in its closed position form a shunt around the protective device. Such a switch shall not be used as a substitute for the protective device.

It is recommended that the antenna grounding switch be employed, and that in addition a switch rated at not less than 30 amperes, 250 volts, be located between the lead-in conductor and the receiver set.

j. If fuses are used, they shall not be placed in the circuit from the antenna through the protective device to ground.

k. The protective grounding conductor may be bare and shall be of copper, bronze or approved copper-clad steel. The protective grounding conductor shall be not smaller nor have less conductance per unit of length, than the lead-in conductor and in no case shall be smaller than No. 14 if copper nor smaller than No. 17 if of bronze or copper-clad steel. The protective grounding conductor shall be run in as straight a line as possible from the protective device to a good permanent ground. Preference shall be given to water piping. Other permissible grounds are grounded steel frames of buildings or other grounded metal work in the building, and artificial grounds such as driven pipes, rods, plates, cones, etc. Gas piping shall not be used for the ground.

l. The protective grounding conductor shall be guarded where exposed to mechanical injury. An approved ground clamp shall be used where the protective grounding conductor is connected to pipes or piping.

m. The protective grounding conductor may be run either inside or outside the building. The protective grounding conductor and ground, installed as prescribed in the preceding paragraphs k and l, may be used as the operating ground.

It is recommended that in this case the operating grounding conductor be connected to the ground terminal of the protective device.

If desired, a separate operating grounding connection and ground may be used, this operating grounding conductor being either bare or provided with an insulated covering.

n. Wires inside buildings shall be securely fastened in a workmanlike manner and shall not come nearer than 2 inches to any electric light or power wire not in conduit unless separated therefrom by some continuous and firmly fixed non-conductor, such as porcelain tubes or approved flexible tubing, making a permanent separation. This non-conductor shall be in addition to any regular insulating covering on the wire.

o. Storage battery leads shall consist of conductors having approved rubber insulation. The circuits from storage batteries shall be properly protected by fuses or circuit breakers rated at not more than 15 amperes and located preferably at or near the battery.

3703. FOR TRANSMITTING STATIONS ONLY

a. Antenna and counterpoise outside buildings shall be kept well away from all electric light or power wires of any circuit of more than 600 volts, and from railway, trolley or feeder wires, so as to avoid the possibility of contact between the antenna or counterpoise and such wires under accidental conditions.

b. Antenna and counterpoise where placed in proximity to electric light or power wires of less than 600 volts, or signal wires, shall be constructed and installed in a strong and durable manner, and shall be so located and provided with suitable clearances as to prevent accidental contact with such wires by sagging or swinging.

c. Splices and joints in the antenna and counterpoise span shall be soldered unless made with approved splicing devices.

d. Lead-in conductors shall be of copper, bronze, approved copper-clad steel or other metal which will not corrode excessively and in no case shall be smaller than No. 14.

e. Antenna and counterpoise conductors and wires leading therefrom to ground switch, where attached to buildings, shall be firmly mounted 5 inches clear of the surface of the building, on non-absorptive insulating supports such as treated pins or brackets, equipped with insulators having not less than 5 inches creepage and air-gap distance to inflammable or conducting material, except that the creepage and air-gap distance for continuous wave sets of 1000 watts and less input to the transmitter, shall be not less than 3 inches.

f. In passing the antenna or counterpoise lead-in into the building a tube or bushing of non-absorptive, insulating material, slanting upward toward the inside, shall be used and shall be so insulated as to have a creepage and air-gap distance of at least 5 inches to any extraneous body, except that the creepage and air-gap distance for continuous wave sets of 1000 watts and less input to the transmitter, shall be not less than 3 inches. If porcelain or other fragile material is used it shall be protected where exposed to mechanical injury. A drilled window pane may be used in place of a bushing provided creepage and air-gap distance as specified above is maintained.

g. A double-throw knife switch having a break distance of at least 4 inches and a blade not less than ⅛ inch by ½ shall be used to join the antenna and counterpoise lead-in to the grounding conductor. The switch may be located inside or outside the building. The base of the switch shall be of non-absorptive insulating material. This switch shall be so mounted that its current-carrying parts will be at least 5 inches clear of the building wall or other conductors, except that for continuous wave sets of 1000 watts and less input to the transmitter, the clearance shall be not less than 3 inches. The conductor from grounding switch to ground shall be securely supported.

It is recommended that the switch be located in the most direct line between the lead-in conductors and the point where grounding connection is made.

h. Antenna and counterpoise conductors shall be effectively and permanently grounded at all times when station is not in actual operation and unattended, by a conductor at least as large as the lead-in and in no

case smaller than No. 14 copper, bronze, or approved copper-clad steel. This protective grounding conductor need not have an insulated covering or be mounted on insulating supports. The protective grounding conductor shall be run in as straight a line as possible to a good permanent ground. Preference shall be given to water piping. Other permissible protective grounds are the grounded steel frames of buildings and other grounded metal work in buildings and artificial grounding devices such as driven pipes, rods, plates, cones, etc. The protective grounding conductor shall be protected where exposed to mechanical injury. A suitable approved ground clamp shall be used where the protective grounding conductor is connected to pipes or piping. Gas piping shall not be used for the ground.

It is recommended that the protective grounding conductor be run outside the building.

i. The operating grounding conductor shall be of copper strip not less than ⅜ inch wide by 1/32 inch thick, or of copper, bronze, or approved copper-clad steel having a periphery, or girth, of at least ¾ inch, such as No. 2 wire, and shall be firmly secured in place throughout its length.

j. The operating grounding conductor shall be connected to a good permanent ground. Preference shall be given to water piping. Other permissible grounds are grounded steel frames of buildings, or other grounded metal work in the building, and artificial grounding devices such as driven pipes, rods, plates, cones, etc. Gas piping shall not be used for the ground.

k. Where the current supply is obtained directly from lighting or power circuits, the conductors whether or not lead covered shall be installed in approved metal conduit, armored cable or metal raceways.

l. When necessary to protect the supply system from high-potential surges and kick-backs there shall be installed in the supply line as near as possible to each radio-transformer, rotary spark gap, motor and generator in motor generator sets and other auxiliary apparatus one of the following:

1. Two condensers (each of not less than 1/10 microfarad capacity and capable of withstanding 600 volt test) in series across the line with mid-point between condensers grounded; across (in parallel with) each of these condensers shall be connected a shunting fixed spark-gap capable of not more than 1/32 inch separation.

2. Two vacum tube type protectors in series across the line with the mid-point grounded.

3. Resistors having practically zero inductance connected across the line with mid-point grounded.

It is recommended that this third method be not employed where there is a circulation of power current between the mid-point of the resistors and the protective ground of the power circuit.

4. Lightning arresters such as the aluminum cell type.

ARTICLE 38. SIGNS AND OUTLINE LIGHTING

3801. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

3802. MATERIAL

a. Metal used in the construction of sign boxes, cabinets or outline troughs shall be not less than No. 28 U. S. sheet metal gauge (.0156 inch). It shall be galvanized, treated with at least three coats of anti-corrosive paint, or otherwise suitably protected from corrosion.

b. With the exception of wood employed for the external decoration of signs and kept at least 2 inches distant from the nearest socket or receptacle, signs shall be constructed entirely of metal or other approved non-combustible material.

c. The design shall be such as to afford ample strength and rigidity, to render the box or trough practically weatherproof, to enclose all terminals and wiring other than the leads, and to provide drainage for each compartment by means of one or more holes, each not less than ¼ inch in diameter.

d. A separate, completely enclosed, accessible weatherproof approved box or cabinet shall be provided to contain cutouts, flashers, non-weatherproof transformers or other similar devices placed on or within the body or structure of a sign or on the exterior of a building.

e. Raceways shall not be employed for outline lighting.

3803. SOCKETS AND RECEPTACLES

a. Sockets and receptacles for sign and outline lighting shall be of the keyless porcelain type, and if for sign use shall be so designed as to afford permanent and reliable means to prevent turning. Terminals of sign receptacles shall be kept at least ½ inch from metal of the sign; provided, however, that where open work is employed as the wiring method, this separation shall be at least 1 inch. Miniature receptacles shall not be employed for outdoor work.

3804. WIRING

a. Wire of approved rubber-covered type, and not smaller than No. 14, shall be used.

b. Wires shall be neatly run, and so disposed and fastened as to be mechanically sure.

c. Wires shall be soldered to terminals for receptacles, and exposed parts of wires and terminals shall be treated to prevent corrosion.

d. Approved bushings shall be employed to protect wires passing through walls or partitions of the structure. Sign leads not encased in conduit or metal armor may be cabled before passing through non-combustible, non-absorptive bushings.

e. Wires on outside of sign structure, except as provided in section 3805 of this code, shall be enclosed in approved conduit or metal armor. Where armor is employed an approved lead sheath shall be placed over the wire insulation.

f. Outline lighting shall be protected by its own cutout and controlled by its own switch.

g. Circuits shall be so arranged that the number of outlets and the lamps connected to them shall in no case be such as to place more than 15 amperes on the branch circuit fuse.

3805. OPEN WIRING

a. Open work may be employed as the wiring method for outline lighting and for signs on roofs or open ground, where not subject to mechanical injury.

b. Where wires are connected to approved receptacles which hold them at least 1 inch from the surface wired over, and which are placed at intervals not exceeding 1 foot, the receptacles themselves shall be considered to afford the necessary support and spacing of the wires. Where the interval between receptacle exceeds 1 foot but is less than 2 feet, an additional non-combustible, non-absorptive insulator maintaining a separation and spacing equivalent to the receptacle shall be used.

c. Where flexible tubing must be employed in outline lighting, the ends shall be sealed and painted with a moisture repellant and the tubing shall be kept at least ½ inch from the surface wired over.

3806. GROUNDING

a. Troughs used for outline lighting shall be grounded as provided in article 9 of this code.

ARTICLE 39. THEATRES; INCLUDING MOTION PICTURE HOUSES

3901. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. A theatre shall be deemed to be that building, or part of a building, regularly or frequently used for dramatic, operatic, motion picture or other performances or shows, or which has a stage for such performances used with scenery or other stage appliances.

c. Emergency lights shall be deemed to be exit lights and all lights necessary to properly illuminate lobbies, stairways, corridors and other portions of the theatre to which the public has access, which are normally kept lighted during the performance.

3902. SERVICES

a. Where the supply can be obtained from two separate street mains, two separate and distinct services shall be installed, one service being of sufficient capacity to supply current for the entire equipment of the theatre, the other service being of sufficient capacity to supply current for all emergency lights. Where the supply cannot be obtained from two separate sources, the feed for the emergency lights shall be taken from a point on the street side of the main service fuses.

b. Where the source of supply is an isolated plant located in the building, an auxiliary service of capacity sufficient to supply all emergency lights shall be obtained from some outside source, or from an adequate storage battery installed upon the premises.

3903. AUDITORIUM

a. Approved conduit, metal raceway or armored cable shall be employed as the wiring method.

b. Receptacles shall be inclosed in boxes.

c. Not more than one set of fuses shall be interposed between service fuses and exit lights.

d. Emergency lights shall not be connected to or controlled by the stage lighting control, but from the lobby or other convenient place in the front of the theatre.

e. All fuses shall be inclosed in approved cabinets.

3904. STAGE

a. Approved conduit or armored cable shall be employed as the wiring method.

b. The switchboard shall be of the dead-front type, and shall carry a metal hood running the full length of the board and protecting the latter from falling objects.

c. Dimmers shall be so connected that they will be dead when their respective circuit switches are open.

d. Footlights shall be wired by either the conduit or the armored cable method, receptacles being inclosed in approved boxes, or the wires shall be encased in metal trough composed of No. 20 U. S. sheet metal gauge (.0375 inch), treated to prevent oxidation. Conductors shall be soldered to receptacle terminals, which shall be kept at least ½ inch from the metal of the trough.

e. Footlights, border lights and proscenium side lights shall be so wired that the number of outlets and the lamps connected to them shall in no case be such as to place more than 15 amperes on a branch circuit fuse.

f. Borders and proscenium sidelights shall be constructed as prescribed in paragraph d of this section, shall be suitably stayed and supported, and shall be so designed that the flanges of the reflectors or other adequate guards will protect the lamps from mechanical injury and from accidental contact with scenery or other combustible material.

g. Border cables shall be of approved type and suitably supported. They shall be employed only where flexibility is required.

h. Approved slow-burning wire shall be used for wiring the border.

i. Borders shall be suitably suspended. If wire rope is used each length shall be insulated by at least one strain insulator, placed close to the border.

j. Stage and gallery pockets shall be of approved type, and controlled from the switchboard. Feeds for arc pockets shall be not smaller than No. 6, and the receptacles shall have a capacity of not less than 35 amperes. Feeds for incandescent pockets shall be not smaller than No. 12, and the receptacles shall have a capacity of not less than 15 amperes. Feeds to pockets shall be of ample size to supply all receptacles therein at full rating. Plugs for arc and incandescent pockets shall not be interchangeable.

k. Lamps installed in scene docks shall be so located and guarded as to be free from mechanical injury.

l. Curtain motors shall be of the inclosed type.

m. Where stage flue dampers are released by an electrical device, the circuit operating the latter shall be normally closed, and shall be controlled by at least two approved single pole switches enclosed in approved iron boxes having self-closing doors without locks or latches, one switch being placed at the electrician's station and the other where designated by the inspection department. The device shall be designed for the full voltage of the circuit to which it is connected, no resistance being inserted. It shall be located in the loft above the scenery and shall be enclosed in a suitable iron box having a tight, self-closing door.

3905. DRESSING ROOMS

a. Approved conduit or armored cable shall be employed as the wiring method.

b. Pendants for lights shall be composed of approved reinforced cord, armored cable or armored cord.

c. Lamps shall be protected by approved guards sealed or locked in place.

3906. PORTABLE ARC LAMPS

a. Arc lamps shall be substantially constructed entirely of metal not less than No. 20 U. S. sheet metal gauge (.0375 inch), except where approved insulating material is necessary. The design shall be such as to provide proper ventilation while retaining sparks, and to prevent carbons or other live parts of lamp from making contact with metal of hood.

b. Hoods for other than lens lamps shall have the front opening equipped with a self-closing hinged door frame carrying either wire gauze or glass. Hoods for lens lamps may have a stationary front, and a solid door on either back or side.

c. Mica shall be used for the insulation of the lamp frame.

d. Arc lamp frames and standards shall be so installed and guarded as to prevent their becoming grounded.

e. The switch on the standard shall be of such design that accidental contact with any live part will be impossible.

f. Stranded connections in lamp and at switch and rheostat shall be provided with approved lugs.

g. Rheostats shall be enclosed in a substantial properly ventilated metal case affording a clearance of at least 1 inch between case and resistance element. If the rheostat is mounted on the standard, a clearance of 3 inches above the floor shall be maintained.

h. A qualified operator shall be employed for each lamp, or for each two lamps not more than 10 feet apart and so placed that one operator can properly watch and care for both.

3907. PORTABLE BUNCHES

a. Substantial metal shall be employed and the wiring shall not be exposed.

b. Where the cable passes through the metal, an approved bushing shall be employed, and the cable shall be so anchored as to relieve the connections of any mechanical strain.

3908. PORTABLE STRIPS

a. Portable strips shall conform to the requirements of paragraphs d, e, and f of section 3904, of this code.

b. Where the cable passes through the metal an approved bushing shall be employed, and the cable shall be so anchored as to relieve the connections of serious mechanical strain.

3909. PORTABLE PLUGGING BOXES

a. The construction shall be such that no current-carrying part will be exposed.

b. Each receptacle shall have a current-carrying capacity of 30 amperes, and shall be protected by approved fuses mounted on slate or marble bases enclosed in a fireproof cabinet equipped with self-closing doors.

c. Bus bars shall have a current-carrying capacity equal to the sum of the ampere ratings of all the receptacles. Approved lugs shall be provided for the connection of the master cable.

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

3910. PORTABLE CONDUCTORS

a. Pin-plug connectors shall be so designed that tension on the cable will not cause serious mechanical strain on the connections. The female half shall be attached to the live end of the cable.

b. Flexible conductors used from receptacles to arc lamps, bunches and other portable equipments shall be approved stage cable except that for the purpose of feeding a stand lamp under conditions where conductors are not liable to severe mechanical injury, an approved reinforced cord may be used, provided cut-out designed to protect same is not fused over 15 amperes capacity.

3911. LIGHTS ON SCENERY

a. Brackets shall be wired internally, and the fixture stem shall be carried through to the back of the scenery, where a suitable bushing shall be placed on the end of the stem. Fixtures shall be securely fastened in place.

3912. STRING OR FESTOONED LIGHTS

a. Joints in wiring shall be staggered where practicable.

b. Lamps enclosed in lanterns or similar devices shall be equipped with approved guards.

3913. SPECIAL ELECTRICAL EFFECTS

a. Devices used for simulating lightning, waterfalls, etc., shall be so constructed and located that flames, sparks, etc., cannot come in contact with combustible material.

ARTICLE 40. SMALL ISOLATED PLANTS

4001. GENERAL

a. The requirements of this article shall be deemed to be additional to, or amendatory of, those prescribed in articles 1 to 19, inclusive, of this code.

b. This article shall be deemed to apply particularly to isolated plants which employ as their prime mover a stationary internal-combustion engine, with its necessary fittings, connected to an electric generator either with or without an auxiliary storage battery with its control devices, and operating at a potential of less than 50 volts.

c. Attention shall be given to the relatively low voltage at which these plants operate, thus requiring a greater current for equivalent energy and making necessary a greater ampere capacity of conductors, fittings, devices and appliances, as compared with those of the standard 0-600 volt classification used on commercial circuits.

4002. SOCKETS AND RECEPTACLES

a. Standard lamp sockets and receptacles of the 250 volt classification shall be used. Sockets and receptacles of the 250 volt, 250 watt classification shall not be used for currents greater than 3½ amperes.

4003. AUTOMATIC CUTOUTS

a. Fuses shall be so placed that no set of small motors, small heating appliances or incandescent lamps, nor more than 8 lamp sockets or receptacles, requiring more than 320 watts, shall be dependent upon one cutout.

b. The fuses in the branch circuit shall not exceed 10 amperes rating.

4004. BATTERIES

a. Batteries shall be located in rooms or spaces having natural means of ventilation.

b. Battery jars and cells, if not composed of insulating material such as glass or hard rubber, shall be mounted on insulating supports of glass or porcelain.

4005. GROUNDING

a. The grounding of circuits or frames of engine or generator shall not be required.

ARTICLE 50. SYSTEMS AND VOLTAGES OF OVER 600 VOLTS

5001. SERIES ARC LIGHTING

a. Constant current systems shall not be installed in buildings, except by permission of the inspection department.

b. Wires shall be of approved rubber-covered type and shall be kept in plain sight except where the inspection department requires that they be encased.

c. Wires shall be supported on glass or porcelain insulators which rigidly separate the wires at least 8 inches and maintain them at least 1 inch from the surface wired over. This requirement shall not apply to locations where such separations are impracticable, as inside lamps, on hanger boards, etc.

d. Wires on side walls shall be encased in a boxing as provided in section 501, paragraph o, of this code.

e. Wires crossing floor timbers in cellars or rooms where they might be exposed to injury shall be installed on running boards or protected by guard strips as provided in section 501, paragraph m, of this code.

f. The service shall enter through an approved double-contact switch, mounted in a moisture-proof non-combustible case, so located as to be readily accessible to police or firemen. This switch shall be of the indicating type, shall close the main circuit and disconnect the branch wires when turned "off" and shall be so designed that it will automatically continue its action when once started. It shall prevent an arc between the points under all circumstances.

g. Arc lamps shall conform generally to the requirements of article 1501, of this code. When hanger boards are not used, lamps shall be hung from insulating supports other than their conductors.

h. Incandescent lamps shall be suspended from hanger boards by rigid pipes, and shall not be attached to gas fixtures. Each lamp shall be provided with an automatic cutout. No electro-magnetic switching device shall be employed, nor shall the lamps be connected in multiple-series or series-multiple.

5002. VACUUM TUBE SYSTEMS

a. The tube shall be so installed as to be free from mechanical injury or contact with inflammable material. Coils and regulating apparatus shall be mounted on approved non-combustible non-absorptive insulating bases and inclosed in a well ventilated grounded approved steel cabinet having walls not less than 1/10 inch in thickness, the ventilation being so designed as to prevent the emission of flame or sparks.

b. Wiring leading to the above cabinet shall conform to the requirements of article 5 of this code, if such wires operate at a potential not exceeding 300 volts.

5003. WIRING

a. Circuits operating at more than 7500 volts between conductors shall not be installed in buildings other than central stations, sub-stations or transformer vaults.

b. Elsewhere than in central stations, sub-stations, and generator, transformer, switching, and motor rooms, all apparatus and wiring connected to circuits of more than 600 volts shall be completely inclosed by substantial shields or casings, and when these shields or casings are of metal they shall be grounded as prescribed for the grounding of equipment in article 9 of this code, and the conduit shall properly enter and be secured to such shield or casing, or to suitable terminal boxes secured or bolted to the casing.

c. Generator, switching and motor rooms containing apparatus operating at more than 600 volts shall be securely locked to limit access to qualified persons only.

d. Elsewhere than in central stations, sub-stations, and generator, transformer, switching and motor rooms, all wiring of circuits of more than 600 volts shall consist of approved multiple-conductor, grounded metal-sheathed cable inclosed in approved grounded conduit. Where the cable is not exposed to moisture, the metal sheath may be omitted by permission of the inspection department. Where moisture is absent, the metal sheath need not be continued over splices; but where the metal sheath is required over the rest of the cable the ends of the sheath shall be bellied out and bounded around the splices by No. 6 copper wire and ground clamps.

e. Air-break disconnectors shall be installed between oil switches used as service switches and the supply wires.

f. Where a cable emerges from its metal sheath, the insulation of the several conductors shall be thoroughly protected from moisture and mechanical injury by a pothead or equivalent device.

g. Open work may be employed in central stations, sub-stations, generator, transformer and switching rooms and motor rooms adjoining an outside wall where the wires entering the motor room are not in conduit, provided the wires are rigidly supported on glass or porcelain

insulators which keep them at least 1 inch from the surface wired over and 8 inches apart except at apparatus and devices.

Rigid supporting requires supports about 4½ feet apart when wiring along flat surfaces under ordinary conditions.

5004. MOTORS

a. Motors operating at a potential exceeding 2500 volts to ground shall not be installed elsewhere than in central stations, sub-stations and generator and motor rooms.

5005. TRANSFORMERS AND APPARATUS

a. Transformers installed in central stations and sub-stations shall be so located that fire and smoke from burning coils or boiling oil will be unlikely to do harm.

It is recommended that air cooled transformers be isolated as much as possible, and that, if air blast is employed, the ducts be fireproof.

It is further recommended that oil-filled transformers be placed in a compartment constructed in accordance with section 5007 of this code.

b. Transformers shall not be installed in buildings other than central stations or substations, except by permission of the inspection department. Where such permission has been granted, transformers shall be located as near as possible to the point at which the primary wires enter the building and shall be contained in an enclosure of fire-resistive material large enough to provide an air space of at least 6 inches on every side of the transformers. This enclosure shall be securely locked, access being allowed only to authorized persons, and shall be thoroughly ventilated.

It is recommended that ventilation be secured by means of a chimney or flue leading out of doors.

c. Transformer cases shall be grounded as prescribed for the grounding of equipment in article 9 of this code; provided, however, that cases or frames of transformers used exclusively to supply current to switchboard instruments need not be grounded if they are installed and guarded as required for the maximum potential at which they operate.

d. For oil-filled transformers which are not located in central stations or sub-stations, the inclosure required by paragraph b of this section shall consist of fireproof vault construction in accordance with section 5007 of this code. This shall not apply to the control circuit transformer furnished with control equipment. These transformers shall be considered as subject to the requirements applying to the equipments with which they are used.

e. For transformers in electric furnace rooms the requirements of this section and of section 5007 of this code shall be followed so far as practicable; provided, however, that by permission of the inspection department, oil-filled transformers having a total rating of 75 k.v.a. or less, may be located in electric furnace rooms of fire-resisting construction, if surrounded by concrete curbs not less than 6 inches high and forming a basin of sufficient capacity to retain all the oil used in such transformers.

This is to guard against the possibility of molten metal from the furnace coming in contact with the transformer casing, and also to prevent oil from the transformers reaching the furnace.

5006. SWITCHES

a. Oil circuit breakers and switches shall be isolated from other switches and electrical apparatus wherever practicable. When operated at a potential exceeding 7500 volts, they shall be of the remote control type, and shall be placed in separate fireproof cells or compartments.

It is recommended that oil switches used to control transformers be located in the transformer vault.

b. All switches including disconnectors shall be so located that the point from which they are operated is safely accessible to qualified and authorized persons.

5007. TRANSFORMER VAULTS

a. The enclosure shall consist of concrete not less than 6 inches in thickness, or of brick not less than 8 inches in thickness, except that when the total transformer capacity so enclosed is not over 100 kilovolt amperes the above thickness may be reduced to 4 inches, provided approved fireproof material is employed and the construction of the vault is specifically approved by the inspection department.

It is recommended that outside walls of the building, if of fireproof construction, constitute one or more of the walls of the vault or enclosure.

b. The enclosure shall be provided with means for ventilation which will prevent the development of room temperatures in excess of those at which the transformers installed therein may be safely operated. Limiting temperatures shall be determined in accordance with and in the manner prescribed by the standardization rules of the American Institute of Electrical Engineers, and temperatures under full load shall not exceed the values given in such rules. All ventilating openings not connected to chimneys or flues shall be provided with automatic or manually controlled dampers to prevent the emission of smoke or fire.

It is recommended that damper controls be arranged to be operated from a point outside the vault.

c. Where practicable, a suitable drain shall be provided which will carry off any accumulation of oil or water that may collect in the vault. Floor and drain shall have a pitch of not less than ¼ inch per foot. In vaults containing transformers having a total capacity of 100 kilo-volt amperes or less the drain may be omitted if the enclosure is so constructed as to retain all the oil used within the vault.

d. Unless access is from outside the building only, the doorway to the vault shall be thoroughly closed by means of an approved tight-fitting firedoor. A door sill not less than 4 inches in height shall be provided. In all cases the sill shall be of sufficient height to confine within the vault the oil from the largest transformer installed.

5008. STATIC CONDENSERS

a. Static condensers of the type made up of small units, each of which contains less than three gallons of oil, may be installed in power houses or factory buildings if combustibles are kept well away from them. In rooms containing combustible dust or flying material, condensers shall be inclosed.

If condensers are accessible to other than qualified persons a non-combustible grille or guard around them may be desirable.

b. Condensers which have all units in single tanks filled with oil shall be installed as required for transformers in section 5005.

c. For transformers used with static condensers, the requirements of section 5005 shall be followed; provided, however, that by permission of the Inspection Department, oil-filled transformers intended for and used only with static-condenser installations and not subject to lightning disturbances may be installed in rooms of non-combustible construction and occupancy. Such transformers shall be of sufficient capacity to allow for ordinary rises in voltage; they shall be surrounded by concrete curbs not less than 6 inches high which form a basin of sufficient capacity to retain all the oil contained in the transformers; and be protected by an automatic overload circuit-breaker (or other protective device and switch) set to operate at a current corresponding to not over 150% of the rated capacity of the condenser.

5009. SERVICE EQUIPMENT

In services operating at more than 600 volts, all underground conductors shall, except as provided below, be controlled and protected by an automatic overload circuit-breaker which shall be of suitable rupturing capacity and which shall be located as near as possible to the point where the service enters the building and so that the point from which it is opened or closed will be readily accessible. Each service lead shall have an air-break disconnector which will disconnect from the supply line all apparatus within the building. If the service does not supply, at the primary voltage, any equipment except that contained in a fireproof transformer vault, or if it enters only a detached transformer house or inclosure, then suitable disconnectors and suitable fuses may be used and may be installed in the transformer inclosure. If in such cases the voltage does not exceed 2300 volts to ground and the installed transformer capacity does not exceed 50 k.v.a. per phase, suitable fuses without disconnectors may be installed in the transformer inclosure. In all cases where automatic overload circuit-breakers are not installed in the primaries and arranged so that they may be tripped manually from a readily accessible point outside of the transformer vault or inclosure, suitable circuit-breakers or switches and suitable fuses shall be provided in the secondaries as required for low-voltage services in article 4 of this code.

Air-break disconnectors and fuses shall be accessible to qualified attendants only.

ARTICLE 60. SIGNAL SYSTEMS

6001. GENERAL

a. The provisions of this article shall apply to telephone, telegraph (except radio), district messenger and call-bell circuits, fire and burglar alarm and similar systems.

Such systems are hazardous only because of their liability to become crossed with electric light, heat or power circuits.

6002. OUTSIDE WIRES

a. Outside wires shall be placed in underground ducts or strung on poles. They shall not be run across or attached to roofs except by permission of the inspection department.

b. Underground wires shall not be placed in a duct, handhole or manhole containing electric light or power wires. Where a handhole or a manhole is divided into sections by means of partitions of brick, concrete or tile, each compartment shall be considered as a separate handhole or manhole.

c. Overhead wires shall not be attached to a crossarm carrying electric light or power wires, nor shall they, when on the exterior walls of buildings, be brought closer than 4 inches to electric light or power wires unless one system is in conduit or is permanently separated from the other system by a continuous and firmly-fixed non-conductor, additional to the insulation on the wires.

d. The metal sheath of aerial cables which are liable to contact with electric light or power wires shall be interrupted close to the entrance to a building by an insulating joint or equivalent device.

e. The distance between the two inside pins of any crossarm of a pole carrying signal and electric light and power wires shall be not less than 24 inches.

It is recommended that signal wires, being smaller and more liable to break and fall, be placed on the lower crossarms.

f. Aerial cables of the metal-sheathed type may have paper or other suitable insulation. If the metal sheath is omitted each wire shall have 1/32 inch rubber insulation and the bunched wires shall be covered with a substantial braid.

g. Wires from the last outdoor support to the protector, and wires attached to buildings shall conform to the requirements of paragraph f of this section, and in addition shall carry a substantial braid on each wire. Where not in conduit, such wires shall be separated from woodwork and supported on glass or porcelain insulators.

h. Wires shall enter buildings either through non-combustible, non-absorptive, insulating bushings, or through approved rigid conduit. Conduit or bushings shall slope upward from the outside, or, where this cannot be done, drip loops shall be formed in the wires immediately outside the point of entrance. The conduit shall be equipped with an approved service head. More than one wire may enter through one conduit or bushing.

6003. IN BUILDINGS; GENERALLY

a. Wires beyond the protector, or wires inside buildings where no protector is employed, shall be neatly arranged and secured in place in a convenient, workmanlike manner. They shall not approach nearer than 2 inches to any electric light or power wire unless one system is in conduit or the two systems are permanently separated by a continuous and firmly-fixed non-conductor, additional to the insulation on the wires.

The wires would ordinarily be insulated, but the kind of insulation is not specified, as reliance is placed on the protector to stop all dangerous currents. Porcelain tubes or approved flexible tubing are considered suitable non-conductors.

b. Wires bunched together in a vertical run shall have a fire-resisting covering sufficient to prevent the carrying of fire from floor to floor. This requirement shall not apply if the wires are encased in non-combustible tubing, or are located in a fireproof shaft having fire stops at each floor.

c. Signal wires and electric light and power wires may be run in the same shaft if the two systems are separated at least 2 inches, or if either system is encased in non-combustible tubing.

d. Signal wires shall not be placed in a tube containing electric light or power wires.

6004. IN BUILDINGS: WHERE THE DISTRIBUTION SYSTEM CONSISTS OF AERIAL WIRES

a. An approved protector shall be placed as near as practicable to the point of entrance to the building. The protector shall be mounted on a non-combustible, non-absorptive insulating base and shall consist of an arrester between each line wire and ground and a fuse in each line wire, the fuses protecting the arrester. The protector terminals shall be plainly marked to indicate "line," "instrument" and "ground."

b. The protector shall not be placed in the immediate vicinity of easily ignitable material or inflammable gases, or dust flyings of combustible material.

c. Where the entire street circuit is run underground a protector shall not be required unless the circuit within the block is so placed as to be liable to accidental contact with electric light or power wires operating at a potential exceeding 250 volts.

6005. GROUNDING

a. The ground conductor of the protector shall consist of not less than No. 18 copper, having 1/32 inch rubber insulation, covered with a substantial braid. Where necessary, it shall be guarded from mechanical injury.

b. The ground conductor shall be run in as straight a line as possible to a permanent and effective ground. Where connection is made to a gas pipe, attachment shall be made between the meter and the street main. In every case the attachment shall be made as close to the earth as practicable.

A suitable ground may be obtained by connection to either a water pipe or a gas pipe, preferably to the former. A ground rod or pipe driven into permanently damp earth is acceptable, in the absence of a piping system.

c. The ground conductor shall be attached to the pipe by means of an approved bolted clamp to which the conductor is soldered or otherwise connected in an approved manner, or the pipe shall be tinned with rosin flux solder after which the conductor shall be wrapped around the pipe and thoroughly soldered to it.

d. Steam or hot water pipes shall not be employed as a ground for protectors.

The following changes and additions to the provisions of the 1925 Edition of the National Electrical Code have been adopted.

ARTICLE 5. WIRING METHODS

501. OPEN WIRING

j. *Change to read:* Wires supported on solid knobs shall be securely tied thereto. If wires are used for tying, they shall have an insulation of the same type as that of the wires which they confine.

503. CONDUIT WORK

b. *Change to read:* No conduit smaller than ½ inch, electrical trade size, shall be used except for concealed extensions from existing outlets of branch circuits in buildings of fire-resistive construction, where conduits, either flexible or rigid, not smaller than 5/16 inch, electrical grade size, may be used with only one No. 14 Type R wire in one conduit. Such concealed extensions may also be made with other forms of metal raceways and fittings especially approved for the purpose. When so used, the conduit or raceway shall be laid on the face of the fireproofing and be plastered over. It shall not be run in concealed spaces. The extensions shall be confined to the room or suite in which they originate.

c. *Change to read:* Rigid conduit as shipped shall be in 10 foot lengths with each end reamed and threaded and shall have an interior coating of a character and appearance which will readily distinguish it from ordinary pipe commonly used for other than electrical purposes. One coupling shall be furnished with each length.

o. *Change to read:* Vertical wires of No. 1 or larger shall not be deflected where they enter or leave a cabinet unless a gutter having a width in accordance with the following table is provided.

Capacity of Feeder Connection. Amperes.	Minimum Width of Gutter. Inches.
100	3
200	4
400	6
600	8
800	10
1200	12

504. OTHER WIRE RACEWAYS

Change title of this section to read: "Raceways for Surface Wiring."

a. *Change to read:* Raceways shall be used only in exposed dry locations (except for concealed extensions as provided in paragraph b, of Section 503, of this Article) and where the maximum difference of potential between the wires therein does not exceed 300 volts. They shall not be placed in elevator shafts.

f. *Change to read:* Not more than four No. 14 or No. 12 wires, nor any circuit protected by fuses larger than 20 amperes at 125 volts or 10 amperes at 250 volts, shall be placed in any metal raceway.

g. *Change to read:* Where alternating current is to be employed in connection with metal raceway work, all wires of a circuit shall be placed in one raceway except for concealed extensions as provided in paragraph b of section 503, of this Article.

(The text of the indented note following this paragraph to be continued without change.)

505. ARMORED CABLE

b. *Change to read:* Where alternating current is to be employed, all conductors of a circuit shall be contained within one armor, except that single conductor armored cable may be used, with suitable fittings at outlets, for concealed extensions from existing outlets of branch circuits in buildings of fire-resistive construction. When so used, the single conductor armored cable shall be laid on the face of the fireproofing and be plastered over. It shall not be run in concealed spaces. The extensions shall be confined to the room or suite in which they originate.

(The text of the indented note following this paragraph to be continued without change.)

506. Decorative Lighting Systems. This section to be renumbered 508. Its text to be continued without change.

507. Insulation Resistance. This section to be renumbered 509. Its text to be continued without change.

506. Underfloor Raceways. (New Section.)

a. Underfloor raceways shall be used only in dry locations in buildings of fire-resistive construction when imbedded in the concrete or concrete fill of the floor and where the maximum difference of potential between the wires installed therein does not exceed 300 volts.

b. Underfloor raceways shall be of an approved type and may be placed in the concrete fill between the rough and the finished floor when there is at least 1 inch of concrete placed above the raceway. Open bottom types of underfloor raceways shall not be used in floors of monolithic construction. Other types of underfloor raceways shall not be used in monolithic construction floors without the consent of supervising structural authorities having been obtained in addition to the approval of the authority enforcing these regulations.

c. Open bottom types of underfloor raceways shall not be used in shallow floor concrete fills unless proper cover is maintained and a pad of 1 inch concrete or approved fittings protect the wiring from contact with piping, structural steel or other obstructions. The raceway shall only be laid on a smooth clean surface and in deep concrete fills, it shall be brought to the proper level by setting it on a concrete pad of proper thickness and at least twice the width of the raceway.

d. Underfloor raceways shall be laid so that a straight line from the center of one junction box to the center of the next junction box will coincide with the center line of the raceway. Raceways shall be made mechanically secure to prevent disturbing this alignment during construction.

e. All joints along edges of raceways and between raceways, couplings and junction boxes, and between the junction box cover plates and cover ring shall be filled with an approved waterproof cement. Raceways with their fittings shall be so arranged that there will be no low points or traps at the fittings or in the raceway run. Crossings shall be avoided wherever possible.

f. Where raceways are run at other than right angles, special fittings shall be provided if, in the judgment of the authority enforcing these regulations, these are necessary. Connection between raceways and distribution center or side wall outlets shall be by means of conduit or approved fittings. All dead ends of raceways shall terminate in a junction box or other approved fitting.

g. Inserts or outlets in raceways shall be made in an approved manner with approved fittings and shall make a tight contact. In the case of metal raceways, inserts shall be well grounded to the raceway. Inserts in fibre raceways shall be screwed into the fibre and shall not be set until floor is laid unless inserts are made mechanically secure by separately grouting them in. All inserts and junction boxes shall be carefully leveled to the floor grade and sealed with an approved watertight plug.

h. Care shall be exercised in setting inserts and when cutting through the raceway wall that chips and other dirt do not fall into the raceway. Special tools designed to eliminate this objection and to prevent the tools entering the raceway and injuring wires already there, shall be employed.

i. Metal raceways and all metal fittings shall be suitably protected from corrosion.

j. Raceways shall be continuous from outlet to outlet or from approved fitting to approved fitting.

k. Underfloor raceways of metal shall be grounded as prescribed for other metal wiring raceways in article 9 of this code, and at a point as near as practicable to the source of supply; provided, however, that this requirement shall not apply to isolated raceway runs not exceeding 25 feet, when these runs are free from metallic contact with the ground and from adjacent grounded metal and are guarded when within reach from grounded surfaces.

l. When combination underfloor raceways are used both for signal and for lighting and power wires, the different systems shall be run in separate compartments and the same relative position of the compartments shall be maintained throughout the premises, in which case the provisions of paragraph j, section 503, and of paragraphs a and d, section 6003, of this code, shall be considered as having been complied with. Signal wires and wires for light, heating and power circuits may be run in the same compartment of underfloor raceways if all of the wires of either system are encased in non-combustible tubing or metal armor.

m. Where open bottom raceways are used approved double braid rubber-covered wires, Type RD, or armored cable shall be used. Where it is impossible to install the 1 inch pad or cement base crossing other conduits or structural steel, only armored cable shall be used for branch circuits. Wherever armored cable is used, it must be grounded in accordance with article 9 of this code.

n. Wires shall be of approved rubber-covered type, Type R, and shall be continuous from outlet to outlet, or from fitting to fitting, no joints or taps being located in the raceway proper. Joints or taps shall be made in a junction box by splicing and soldering or by use of an approved terminal fitting. Armored cable shall be secured at the outlets by approved fittings.

o. Not more than 10 wires nor any circuit protected by fuses larger than 15 amperes at 125 volts or less, 10 amperes at 125 to 250 volts and where armored cable is used, not more than four, 2-conductor cables shall be placed in any one raceway and this number shall be reduced where in the judgment of the authority enforcing these regulations it is necessary.

p. Wires shall not be drawn in until all mechanical work on the building has been completed.

q. Where alternating current is to be employed in connection with metal raceway work, all wires of a circuit shall be placed in one raceway.

r. Junction boxes shall not be used as outlet boxes and the distance between junction boxes shall not exceed 60 feet.

507. NON-METALLIC SHEATHED CABLE

a. Cable shall not be used for circuits exceeding 300 volts between conductors.

b. Cable shall not be used except for all circuits in residence occupancies, and in out-buildings on the same premises where other types of wiring are not required by this code.

c. Shall be of approved types and of 2- and 3-conductor assemblies in sizes Nos. 14 to 16, inclusive.

d. May be used in exposed wiring work under the following conditions:

1. Shall be mounted directly upon surfaces of woodwork, plaster, cement, brick or other building finish.

2. Shall be secured between outlets with approved fastenings spaced at intervals not exceeding 4 feet.

3. Shall be used only in dry places, and in no place run along the wall nearer than 6 inches above the floor.

4. Shall be protected within 5 feet of floor by wood or metal protecting strip placed over the cable and securely fastened in place.

e. May be used in concealed wiring work under the following conditions:

1. Shall be used only in dry places; in wood joist or stud partitions, floors and walls.

2. When Non-Metallic Sheathed Cable is used for concealed wiring, it shall be secured between outlets by approved fastenings spaced at intervals not exceeding four feet or by other practicable means which will provide for the entire installation being securely fastened in place.

3. Where it is impracticable in concealed wiring to provide the supports specified in the preceding paragraph, runs of Non-Metallic Sheathed Cables may be fished between the outlet boxes or plates.

f. Shall be run without joints, splices or taps from outlet box to outlet box (or junction boxes or plates).

g. Shall be provided with approved outlet (or junction) boxes or plates at each outlet, into which the cable shall be run and to which it shall be rigidly fastened by means of approved fittings, which completely close the opening. If cable enters boxes from the side in concealed work, boxes of 1½ inch depth are required.

It is recommended that for all side wall and partition outlets in concealed work in new buildings under construction outlet boxes having a depth of approximately 1½ inches be used.

h. All bends shall be so made and other handling shall be such that the non-metallic covering of the cable will not be injured.

i. Shall not be buried in plaster, cement, or similar finish.

j. When Non-Metallic Sheathed Cable is installed in conduit the provisions of section 503 of this article shall apply as far as practicable.

k. When in exposed or in concealed wiring, Non-Metallic Sheathed Cable is run through holes in studs, joists or similar wood members, the holes shall be located at the approximate center of studs and not less than 2 inches from the nearest edge of joists or other members whose depth permits this spacing.

l. In attics and roof spaces where within five feet above floor or joists, the cable shall be considered as exposed to mechanical injury, and shall be protected by suitable wood or metal strips securely fastened in place. Cable shall not be used across top of joists in unfinished attics or roof spaces, nor in similar locations.

m. Cable in basements, if used in other than concealed work, shall be run on under side of running board, not less than ⅞ inch by 2 inches, or on side of floor joists or timbers.

ARTICLE 6. CONDUCTORS

602. RUBBER-COVERED WIRE

g. *Change to read:* Single rubber-covered wires No. 8 and smaller, intended for use as identified conductors of circuits, as required in paragraph t of section 611 of this article shall have the outer covering finished to show a white or natural gray color. Twin and twisted pair wires and

multiple conductor cables shall have one conductor identified in this manner and the coverings of the other conductors shall be finished to show solid colors other than white or natural gray.

603. FLEXIBLE CORDS

b. *Change to read:* Each conductor of flexible cords for general use shall have a carrying capacity not less than that of a No. 18 wire.

d. *Sub-paragraph* 11, *change to read:*

(11) (Type H). For Portable Electric Heating Apparatus: This cord is for use with all smoothing and sad-irons, and with other portable electric heating devices which are rated at more than 50 watts, and which produce temperatures in excess of 250 deg. F. (121 deg. C.) on surfaces with which the supply cord is liable to be in contact. The covering may consist of a layer of rubber or other approved material, a covering of asbestos and an outer braid enclosing either all the conductors as a whole, or each conductor separately.

e. *Change to read:* Other types of flexible cords shall be submitted for special examination and shall be approved before being used.

f. *Change second sentence to read:* This marker shall be a tracer in the braid of any color contrasting with that of the braid; or, in case of cords having no braids, the insulation of one conductor shall be of a white or natural gray color and the insulation of the other conductor or conductors shall be of a color or colors which may be readily distinguished from white or natural gray.

609. WEATHERPROOF WIRE. TYPE WP

a. *Change to read:* The insulating covering shall consist of at least three braids, or their equivalent, all of which shall be thoroughly saturated with a dense moistureproof compound.

611. GENERAL REQUIREMENTS FOR USE OF CONDUCTORS

d. *Insert comma after* 8 *in the fifth line.*

ARTICLE 7. OUTLET BOXES AND CABINETS

701. OUTLET FITTINGS

d. *Change the first sentence to read:* Covers of outlet fittings having holes through which flexible cords or duplex wire pendants pass, shall be provided with approved bushings or shall have smooth well-rounded surfaces upon which the cord or wire may bear.

i. *Change to read:* Switch and outlet boxes shall be so designed that they can be securely fastened in place independently of the support furnished by the conduit; provided, however, that with exposed conduit, boxes having threaded or other approved connection may be supported by the conduit itself, if the latter is firmly secured in place.

n. *Change to read:* At the ends of conduit, armored cable or metal raceway from which wires extend to open wiring or to appliances and where a box or plate is not provided as required in the preceding paragraph, approved terminal fittings having a separate bushed hole for each wire shall be provided through which fitting the wires shall pass without splice, joint or tap. This construction shall not be employed at fixture outlets.

ARTICLE 13. SWITCHBOARDS AND PANELBOARDS

1302. SWITCHBOARDS: MATERIAL AND WIRING

f. *Change to read:* In wiring switchboards, the ground detector, voltmeter, pilot lights and potential transformers shall be connected to a circuit that is protected by fuses of a rating not larger than 15 amperes.

ARTICLE 16. ELECTRICALLY HEATED APPLIANCES

Change title to read: 16. ELECTRICAL APPLIANCES.

1601. EXCEPTION

a. *Change to read:* This article shall be construed to apply only to electrical appliances intended for use on circuits operating at more than 50 volts.

1602. GENERAL

a. *Change to read:* Each electrical appliance shall be provided with a name-plate giving the maker's name and the normal capacity of the appliance in volts and amperes, or in volts and watts.

c. *Change to read:* Wires supplying smoothing irons, sadirons and all portable electrical heating appliances which are rated at more than 50 watts and which produce temperatures in excess of 250° F. (121° C.) on surfaces with which the wire is liable to be in contact, shall be approved heater cord, Type H. For other portable electrical heating appliances approved lamp cord, Type C, or other cord specially approved for the purpose shall be used. Wires supplying stationary electrically heated appliances shall conform to the requirements for rubber-covered wire as prescribed in section 602, article 6, of this code; provided, however, that heat-resisting covering shall be used in place of rubber where wires outside the terminal box are subjected to a temperature in excess of 120° F. (49° C.).

d. *Change to read:* Electrical appliances each of 6 amperes or 660 watts or less may be used on branch lighting circuits. Electrical appliances each of 1,320 watts or less may be grouped on a separate branch circuit equipped only with approved plug receptacles and not with lamp sockets. This separate branch circuit shall be protected by fuses having a rated capacity not greater than 15 amperes.

g. *Change to read:* Portable electrical appliances having a capacity not exceeding 6 amperes or 660 watts may be connected individually to lighting circuits.

ARTICLE 31. ELEVATORS

3102. WIRES AND CABLES

a. *Change to read:* The flexible or travelling cables of the operating and lighting circuits shall be of approved Type E cord, as specified in section 603, article 6, of this code. They may be run in properly bushed approved conduit where attached to the car, or may be run exposed and attached directly to the outer surface of the car, extending thence to switches or fixtures within the car.

ARTICLE 33. GARAGES

3302. WIRING

a. *Change to read:* Where floor area is sufficient to permit the storage of more than two vehicles, approved conduit, approved armor cable or approved metal surface wiring raceways shall be employed as the wiring method. Where the floor space will accommodate not more than two vehicles any approved wiring method may be employed.

b. *Change to read:* Cutouts, switches, attachment plug receptacles and fixed lamp holding devices shall be located at least 4 feet above the floor, except in a showroom separated by a partition from the garage proper.

3303. PORTABLES

b. *Change to read:* Flexible cord leads for portable lamps shall be equipped with handle, socket, hook and substantial guard, the guard being securely attached to the socket or the handle. Approved keyless sockets of moulded composition or metal sheathed porcelain type or other keyless sockets approved for the purpose shall be used.

3304. CHARGING CABLES

a. *Change to read:* Approved Type S cord shall be used for charging purposes.

b. *Change to read:* Connectors shall be of approved type and of at least 50 amperes capacity, and shall be so designed or so hung that at least one will break apart readily at any position of the charging cable. Live parts shall be guarded from accidental contact. The fixed, or wall, connector shall be kept at least 4 feet above the floor, and, if not located on a switchboard or charging panel, shall be guarded from accidental contact. Where plugs for direct connection to vehicles are suspended from overhead wiring they shall hang at least 6 inches above the floor and no connector need be placed in the cable or at the outlet.

3306. GENERATORS AND MOTORS

a. *Change to read:* Generators or motors which do not actually form part of the vehicle equipment shall be of the totally enclosed type or shall be so located that unenclosed sparking or arcing parts are at least 2 feet above the floor. Generators and motors, unless of the totally enclosed type, which are located more than two feet but not more than 4 feet above the floor, shall be equipped with wire screens of not less than No. 14 mesh, placed over openings at the commutator end.

3307. SPECIAL PRECAUTIONS

a. *Omit this paragraph and renumber the following paragraphs a and b, respectively.*

ARTICLE 35. MOTION PICTURE PROJECTORS AND EQUIPMENT

3502. PROJECTORS OF THE PROFESSIONAL TYPE

f. *Omit this paragraph.*

3503. ENCLOSURES FOR PROJECTORS OF PROFESSIONAL TYPE

f. *Change to read:* A motor-generator installed in the projector enclosure shall, unless of the enclosed type, have wire screens placed over the commutator end or ends.

3504. PROJECTORS OF THE NON-PROFESSIONAL TYPE

d. *Change to read:* Rheostats, transformers, switches and other current controlling devices shall have no live parts exposed.

ARTICLE 38. SIGNS AND OUTLINE LIGHTING

3802. MATERIAL

c. *Change to read:* The design shall be such as to afford ample strength and rigidity, to render the box or trough practically weatherproof, to enclose all terminals and wiring other than the leads, except as provided in Section 3805 of this Article, and to provide drainage for each compartment by means of one or more holes, each not less than ¼ inch in diameter.

3804. WIRING

e. *Change to read:* Wires on the outside of the sign structure shall, except as provided in the following section, 3805, be enclosed in approved conduit or metal armor. Where conduit work is used it shall be made weatherproof. Where armor is employed an approved lead sheath shall be placed over the wire insulation, Type ACL.

ARTICLE 40. SMALL ISOLATED PLANTS

4002. SOCKETS AND RECEPTACLES

b. *Add new paragraph to read:* Lamp sockets and receptacles shall be rated at not less than 40 watts each, for purposes of installation.

ARTICLE 60. SIGNAL SYSTEMS

6002. OUTSIDE WIRES

g. *Change to read:* Wires from the last outdoor support to the protector, and wires attached to buildings shall have 1/32 inch rubber insulation on each wire, and in addition the wires, individually or bunched, shall be covered with a substantial braid. Where not in conduit, such wires shall be separated from woodwork and supported on glass or porcelain insulators.

i. *Add new paragraph to this section:* The preceding paragraphs g and h shall not apply where the wires enter a building in the form of a cable such as is described in paragraph f of this section nor where the entire street circuit is run underground and the circuit within the block is so placed as to be free from chance of accidental contact with electric light or power wires of over 250 volts.

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6003. IN BUILDINGS; GENERALLY

e. *Add a new paragraph to this section:* Transformers or other devices supplying current to signal systems from electric light or power circuits shall be of a type expressly approved for such service. The secondary wiring shall conform to the requirements of this article and the primary or the charging circuit wiring to the requirements of articles 1 to 19, inclusive, of this code.

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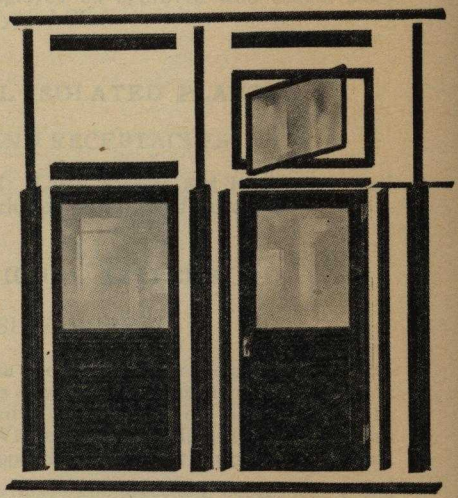

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Regulations of the National Board of Fire Underwriters For the Installation, Maintenance and Use of

PROTECTIVE SIGNALING SYSTEMS

As Recommended by the National Fire Protection Association

EDITION OF 1926

DEFINITIONS

In these regulations the following words are used as defined below:

"Shall" is intended to indicate requirements.

"Should" is intended to indicate recommendations, or that which is advised but not required.

"Approved" refers to approval by the authority having jurisdiction in the enforcement of the regulations.

REGULATIONS FOR THE INSTALLATION, MAINTENANCE AND USE OF PROTECTIVE SIGNALING SYSTEMS

The following requirements apply to the types of electric systems, except municipal fire alarms, usually maintained for the transmission of fire alarms, watchmen's time-recording signals and apparatus and other protective signals affecting the fire hazard.

The portions of these regulations relating to the design and construction of appliances are but a partial outline of requirements. A device which fulfills the conditions herein outlined, and no more, will not necessarily be acceptable. Samples of all appliances should be submitted to the Underwriters' Laboratories for examination and report before being introduced for use.

ARTICLE 1

SYSTEMS DEFINED

100. For the purpose of these regulations, protective signaling systems are classified according to type and character of service rendered and, under most conditions, should be considered in the order given herein.

101. Central Station System. A system, or group of systems, the operations of which are signaled to, recorded in, maintained and supervised from an approved central station, in which there are competent and experienced observers and operators in attendance at all times whose duty it shall be, upon receipt of a signal, to take such action as shall be required under the rules established for their guidance. Such systems shall be independently owned, controlled and operated by a person, firm or corporation engaged solely in furnishing such supervised protective signaling service and having no interest in the protected properties.

102. Proprietary System. A system operated from a local office and having its operations under the control and domination of the owners or others interested in the property to be protected.

103. Auxiliary Fire Alarm System. A system of manually operable fire alarm devices which when operated causes a signal to be transmitted over a municipal fire alarm system.

104. Thermostatic System. A system depending upon the operation of an automatically heat-operated device to transmit or sound an alarm indicating a fire or an abnormal increase in heat which may result in fire.

105. Isolated Fire Alarm Signal System. A local system of electrically supervised fire alarm devices the signals of which are transmitted exclusively within the protected premises.

106. Miscellaneous Systems. All other fire protective signaling systems.

ARTICLE 2

PROVISIONS COMMON TO ALL SYSTEMS

200. General.

201. The terms used in these regulations are, unless otherwise defined herein, the same as those of the National Electrical Code and their intent and meaning are the same as defined therein.

202. All devices and equipment constructed and installed under these regulations shall be approved for the purposes for which they are intended.

203. Full information as required by the inspection department having jurisdiction shall be furnished to and plans approved by it before the installation of devices and equipment is begun.

204. All systems shall be installed in a workmanlike manner and in accordance with the specifications and rules of the inspection department having jurisdiction and other competent authorities not inconsistent with these regulations.

205. Boxes and sounding devices subject to vibration when in operation shall be securely mounted.

206. All systems shall normally test free of grounds, except such parts of circuits or appliances as are intentionally and permanently grounded in order to secure their normal operation.

207. Upon the completion of a system, a satisfactory test of the entire installation shall be made in the presence of and under the direction of the inspection department having jurisdiction.

208. All systems shall be under the supervision of qualified persons satisfactory to the inspection department having jurisdiction and other authorized municipal authorities; these persons shall cause proper tests and inspections to be made at frequent intervals and have general charge of all alterations and additions to the systems under their supervision.

209. A complete record shall be kept of the tests and operations of each system and the records shall be open to examination by the inspection department having jurisdiction.

210. All apparatus requiring winding shall be rewound as promptly as possible after each test or alarm, and kept in normal condition for operation.

211. In hotels, department stores, hospitals and similar institutions, systems having sounding devices, within the protected premises, connected thereto should be so designed that initial fire signals in the

building will sound only in departmental offices, engine room, fire brigade stations and other central locations, with provisions whereby authorized persons may send subsequent signals to sound a general alarm.

220. Wiring.

221. National Electrical Code. The rules of the National Electrical Code—"Article 60, Signaling Systems"—where they apply to protective signaling systems are hereby made a part of these regulations.

222. UNDERGROUND WIRES

a. To secure the largest measure of protection and reliability in the operation of signaling systems, all wires outside of buildings should be placed underground.

b. Wires and cables shall have a lead sheath.

c. By consent of the inspection department having jurisdiction circuits may be carried in cables with circuits of other signaling systems.

d. Terminal boards and cables shall not be located in rooms into which gas may leak from underground systems.

e. Underground cables and terminal boards shall not be permitted in rooms exposed by combustible material stored in the vicinity of same.

223. OVERHEAD WIRES

Where it is impracticable to place wires underground, the following rules shall be observed:

a. Wires shall be at least equal in conductance and tensile strength to No. 14 (No. 12 B. & S.) galvanized iron where single wires are used and to No. 19 B. & S. copper where cables are used.

Note.—For single wires No. 12 copper, No. 14 copper-clad steel or No. 10 aluminum will be accepted.

b. Wires shall have an approved insulating covering. Weatherproof line wires shall have a good covering, consisting of at least two thoroughly saturated and filled braided coverings. Wires in cables shall have an approved insulation, and in addition either a lead sheath or a substantial filled braided covering around the several wires. Wires and cables through trees shall be protected with wooden strips or have "tree wire" insulation.

c. Wires shall be supported on approved insulators at least every 150 feet; so far as possible, shall run under rather than over electric light and power wires; especial attention should be given to preventing accidental contact with such wires.

d. Service wires from the line to the first point of attachment to the building may have approved weatherproof insulating coverings and shall be kept free from awnings, swinging signs, shutters, etc. Where wires are carried along the outside walls of buildings, they shall have an approved rubber insulation; if not in approved rigid conduit they shall be supported at least every 12 feet on approved supports and be kept at least one foot from electric light and power wires. Where required each conductor shall be independently supported on approved insulators.

e. Where wires pass from one building to another they shall, where required, be enclosed in rigid conduit; when such conduit is run underground, the wires therein shall be lead encased.

224. WIRES INSIDE BUILDINGS

Note.—For the wiring in Central Stations of central station systems and in the central offices or equivalent portions of other systems—sections d and f may be modified as circumstances demand.

a. Wires shall be at least equal in conductance and tensile strength to No. 16 B. & S. gauge copper wire where single wires are used, and No. 19 B. & S. gauge copper where cables are used. If wires are not in conduit and are connected directly to electric light and power circuits, they shall be of not less than No. 14 B. & S. gauge, insulated and installed according to the requirements of the National Electrical Code.

b. Wires shall have an approved covering consisting of a rubber insulation at least one thirty-second of an inch in thickness, and a substantial braid, both constructed in accordance with the requirements of the National Electrical Code for rubber covered wire; except that for open work in dry places an approved filled braided covering at least one thirty-second of an inch in thickness may be used.

c. Unless in approved conduit, cable or metal raceways, all wires and cables shall, except as hereinafter provided, be run in plain sight and entirely supported on non-combustible, non-absorptive insulators placed not more than 8 feet apart, and so arranged that the insulating covering of the conductors will come in contact with no other substances than the designed supports, the protecting bushings and the connecting instruments.

d. Wires shall be protected from abrasion and from accidental contact with other conductors. Through floors or where subject to mechanical injury on side walls, approved conduit shall be used. Wires should be run over rather than under pipes, and their coverings shall be separated from contact with all metal work by a solid insulating substance creating a separation of at least ⅛-inch. Special attention shall be paid to the mechanical execution of the work. Careful and neat running, taping of wire and attaching and securing of fittings are required.

e. Wires shall be installed as far as possible without joints. Except in open work, splices will be permitted only in junction or terminal boxes. Splices shall conform with Rule 203 (b) of the National Electrical Code.

f. Wires shall for open work in bay construction follow contour of ceiling, and shall not be strung from beam to beam. In joisted construction, unless run parallel with joists wires shall be placed in conduit or carried in approved cable, metal raceways, or have a 4 in. wide wood backing strip with knobs or cleats fastened to the bottom of this strip.

g. Wires, when passing through any wall or partition, shall be protected by bushings or by other approved means.

230. CURRENT SUPPLY

The permissible methods of current supply which may be used subject to the selection and permission of the inspection department having jurisdiction for the type of signaling systems to be installed, and the regulations governing their use, are as follows:

231. STORAGE BATTERIES IN DUPLICATE

a. Storage batteries shall be of approved make and type in duplicate sets, each set capable of operating the system for a period equal to the normal interval between inspections by a competent attendant, but in no case, less than 60 consecutive hours without recharging. Batteries shall be installed in a room provided with suitable ventilation and shall be enclosed in such manner that gases or fumes therefrom will not expose fire alarm devices or other apparatus or wiring to injury.

b. Cells shall be suitably insulated against grounds or crosses and shall be substantially mounted in such a manner as not to be subject to mechanical injury. Racks or frames shall be suitably protected against deterioration.

c. A reliable source of charging current shall be provided and if deemed necessary by the inspection department having jurisdiction the current supply shall be taken from two separate and independent sources. The charging source shall not be over 250 volts.

d. Charging circuits and boards shall be installed and protected in accordance with the requirements of the National Electrical Code.

e. Batteries shall be protected by enclosed fuses in the main discharging leads.

f. Suitable provisions on a switchboard shall be made for charging the batteries so that they will be protected from injury due to an excessive rate of charge or to the reversing or interruption of the current; provision shall also be made for shifting the respective batteries from charging to working and from working to charging without opening any of the working circuits and so that charging current can not be accidentally connected to any of the working lines.

232. STORAGE BATTERY WITH TRICKLE CHARGING FROM MOTOR-GENERATORS OR RECTIFIERS OR DIRECT CURRENT

a. Only such equipment or devices which have been especially approved for protective signaling systems shall be installed.

b. There shall be provided a sufficient number of motor-generators or rectifiers of adequate capacity to supply all circuits without overloading the equipment, with a storage battery of sufficient capacity floating across the line so connected that normally the battery will be charged.

c. The battery shall be of the type and, in all pertinent respects, except duplication, be installed and maintained in compliance with the provisions of Section 231.

d. Suitable provisions on a switchboard shall be made for automatically disconnecting the generators or rectifiers in case of interruption to the current supply or breakdown in the motor-generator or rectifier set and for operating the signaling system from the storage battery; also for charging the batteries as provided in 231 of these regulations.

e. Each rectifier set shall be provided with replacement parts subject to breakage or rapid deterioration and shall be supplied through a transformer taking energy from a circuit not exceeding 250 volts and arranged to effectively insulate the rectifier circuit from the current supplying the transformer.

233. MOTOR-GENERATOR—FOR USE ONLY FOR SYSTEMS DEFINED UNDER SECTIONS 101 AND 102

a. A sufficient number of motor-generators shall be provided to supply all circuits without overloading any machine. There shall also be provided additional motor-generator sets to replace at least one out of each four sets normally required for operating the system. Motor-generators shall be driven from at least two independent sources of energy; one of these may be a special generator plant, driven by some form of prime mover continuously available.

234. ELECTRIC LIGHT OR POWER SERVICE

a. The current supplied from a reliable electric light or power service may be used direct, provided a separate source of current is available for trouble signal devices.

b. Current procured from a public service supply shall be taken as near as practicable to the service entrance of the premises and on the supply side of the main service switch and cut-out. When the source of supply is an isolated plant located on the premises the supply shall be taken on a connection direct from the main bus-bars.

c. A fuse and suitable resistance, enclosed in a locked or sealed cabinet, shall be installed between the prime source of supply and the signal service conductors in the ungrounded side of the service.

235. PRIMARY BATTERY

a. Batteries for closed circuits shall consist of approved cells of sufficient capacity to operate the signaling system for at least 60 days; such batteries shall be tested and inspected at least every month. Where wet cells are used approved heat-resisting glass jars shall be used.

b. Primary batteries shall be coupled together by approved battery connections.

c. The current flow from any primary battery shall not exceed two amperes.

236. PORTABLE OR AUTOMOBILE TYPE STORAGE BATTERIES

Approved types of such batteries may be used for local service in place of primary cells where provisions satisfactory to the inspection department having jurisdiction are made for care and recharging—

a. Batteries shall be inspected and recharged monthly.

b. A sufficient number of fully charged replacement sets shall be kept in reserve so that the requirement of (a) can be met under all conditions.

c. Batteries shall be charged by trained persons having satisfactory equipment for the purpose.

d. Switches shall be provided so that substitution of replacement batteries may be made without opening working circuits.

e. Systems employing such batteries shall be so devised that a trouble signal shall be actuated before the voltage falls below the point required to successfully operate the system.

237. Current supply batteries shall be recharged before the potential thereof, effective during alarm transmission closures, falls below the following minimum values:

Storage batteries of lead type	1.90 volts per cell
Storage batteries of Edison type	1.10 volts per cell
Primary caustic soda batteries of ordinary type	0.65 volts per cell
Primary caustic soda batteries of the so-called "high" voltage type	0.75 volts per cell

240. Control boards and devices.

241. Under the term "control boards" are included all panels or switchboards, transmitters and similar devices carrying relay instru-

ments, resistors, switches or other mechanisms used for the purpose of supervising or testing circuits or for transmitting or recording signals.

242. Control boards shall be of a type expressly designed and approved for the system for which they are used.

243. Control boards shall be conveniently located where they will be least affected by vibration.

244. Except in stations where competent operators are on duty, all relays shall be mounted so that gravity will tend to retract the armatures; they shall be enclosed in an approved metal case under lock and key, and be located where there is no danger of sparking contacts igniting flammable gases or flyings.

250. Electrical supervision.

251. Systems shall be under constant electrical supervision. (Except magneto type of watchman's time recording apparatus, §810.)

252. The electrical supervision shall cover all sources of energy, except that for the trouble device itself, in such a manner that the failure of such source will give a trouble signal. It shall also cover:

a. All building circuits for boxes, thermostats or other appliances used for initiating a signal.

b. All sounding devices, except where it is necessary or desirable to use sounding devices not readily susceptible to electrical supervision, in which case sounding devices shall be alternately connected to two circuits approximately equally distributed throughout the building.

Note.—This requirement will usually involve electrical supervision of all main relays, contactor relays and other current-carrying parts of devices or control boards. It does not preclude the use of normally open secondary circuits, contacts and the like in transmitter control boards, recording devices and other appliances, the operation of which is subsequent to and dependent on the operation of the electrically supervised main circuits, provided such circuits or parts are suitably enclosed, protected and installed so as not to be liable to mechanical injury.

In thermostatic systems this rule shall not be interpreted to require the thermostats themselves to be electrically supervised when connected in multiple across electrically supervised circuits.

253. The current used for electrical supervision shall be sufficient to retain in normal condition all relays and other devices in a positive and reliable manner, with a suitable factor of safety and to prevent derangement by jars, shocks or vibration.

260. TROUBLE SIGNALS

a. Each electrically tested circuit and the source of energy supply shall be so connected as to operate a trouble bell or other approved trouble signal device which may be in common for several such circuits; and shall be so arranged as to sound continuously during the opening of the circuit or failure of energy.

b. Trouble bells shall be of an approved design and give a distinctive signal.

c. Trouble bells shall not be fitted with silencing switches, except in such a manner that the act of silencing the bell, by the operation of the switch, automatically and positively transfers the trouble signal to another bell or lamp signal located in the quarters of some responsible official.

d. Trouble bells shall be located as required by the inspection department having jurisdiction.

e. If open circuit batteries are used to ring trouble bells, at least two multiple sets of four cells each shall be provided.

f. Systems deriving energy from storage or closed circuit primary cells may use a reserve set or reciprocally employ alternate sets of batteries to operate the trouble bell under conditions acceptable to the inspection department having jurisdiction.

g. Systems deriving energy from underground three-wire direct current central station service may use one side of the system for operating current and the other side to operate trouble bell signals.

270. Manual fire alarm boxes.

271. All boxes shall be of approved type and if for installation in exposed places, shall be weatherproofed.

272. Boxes shall be used for no other than fire protection purposes.

273. Manual fire alarm boxes shall be located in the natural path of escape from fire at a readily accessible point which is not likely to be obstructed.

274. All alarm boxes shall be securely mounted and the lower edge of the box should not be lower than four and one-half feet nor more than six feet from the floor level.

275. Distribution of boxes shall be on the following basis:

a. At least one box on any floor where—

Coded signals are used for fire brigade or exit drills, with additional boxes such that the horizontal distance traveled will not, in general, exceed 100 feet;

Or where the floor area of maximum fire section is 7500 square feet or over.

b. Elsewhere there shall be a box on the first story and each alternate story i. e., third, fifth, seventh, etc.

c. For piers, buildings of large area or buildings where passage is obstructed by partitions, tracks or operating processes, or where the property has multiple tenant occupancy, there shall be additional boxes, as specified by the inspection department having jurisdiction, where in general the distance travelled horizontally will be 200 feet or more.

276. Not over 25 buildings from which distinctive signals are sent shall be connected to a single circuit. Not over 50 boxes or transmitters shall be connected on a single circuit, except in buildings in which the boxes or circuits or both are so designed that signals cannot be sent simultaneously from more than one box, the entire group of boxes shall be considered as one box or transmitter, but this will not allow more than 250 signaling breakwheels to be connected in a single circuit.

ARTICLE 3

CENTRAL STATION SYSTEMS

(See Articles 1 and 2, which also apply.)

300. GENERAL

301. Before acceptance may be obtained for any equipment operating through a central station, there shall be filed with the inspection department having jurisdiction a general description of the apparatus to be installed, together with such detailed information and drawings as are necessary to complete understanding of the operation of the system. Daily reports to customers and to the inspection department may be required.

302. If the inspection department having jurisdiction requires it, there shall also be furnished:

a. Diagrams showing the manner in which the various equipments will be connected to the station and signals delivered to the city fire department and salvage corps.

b. A satisfactory guarantee as to the service to be rendered and as to the maintenance and efficiency of the system.

303. The central station building and its fire protection shall be satisfactory to the inspection department having jurisdiction.

304. The central station shall be equipped with the necessary instruments of an approved pattern for automatically receiving and recording all signals. The time of receipt of signals shall also be recorded, preferably by an automatic device.

305. Stations shall have two independent means of transmitting alarms to the fire department. A direct telephone line from the station to fire alarm headquarters may be approved as one means.

306. The devices and circuits shall be designed and installed so as to meet successfully the most severe conditions liable to be met in practice, and no change or alteration shall be made in same without approval.

307. Circuits other than local circuits wholly within the central station, shall be so arranged that a single break or ground will not prevent the proper transmission of a fire alarm signal.

308. The devices and circuits shall automatically register trouble signals at the central station when any part of the wiring system is grounded or broken. Trouble signals shall be clearly distinguishable from other signals, and shall be such as to compel the operator's attention.

309. The devices and circuits shall be arranged to receive, record and transmit to fire alarm department, salvage corps or insurance patrol, the box number of the building from which an alarm has been received.

310. Stations shall have at least two competent operators on duty constantly, and in addition maintain a service so arranged that any building protected can be reached by a runner within 15 minutes. Where because of conditions or distance such runner service cannot be maintained, the inspection department having jurisdiction shall designate the character of service to be provided. Runner service shall be so maintained that the two operators will always be in attendance, except that in an extreme case one operator may be used as a runner. All runners shall be of mature age.

311. Manual tests of all circuits and central station devices shall be made at intervals of approximately twelve hours.

312. Facilities shall be provided at all central stations for making the following tests:

a. Current strength on each circuit; this current to be adjusted to normal before making other tests.

b. Voltage across terminals of each circuit at the inside terminals of protective devices.

c. Voltage between ground and each side of each circuit.

320. MANUAL FIRE ALARM SYSTEMS

321. Complete and satisfactory test of all boxes and transmitters shall be made monthly and results reported to the inspection department having jurisdiction.

330. Watchmen's time-recording systems.

331. For watchmen's service, where special locations for boxes are not furnished by the inspection department having jurisdiction they shall be located so that the watchman in his rounds will cover the entire premises.

332. COMBINED NIGHT WATCH AND FIRE ALARMS

a. Complete and satisfactory tests of all boxes and transmitters shall be made every six (6) months and results reported to the inspection department having jurisdiction.

b. Shall be so arranged that fire signals which shall be distinct from watch signals can be sent from each station installed.

333. TOUR SYSTEM

a. These systems shall consist of non-transmitting stations so designed that all must be actuated in a fixed order with transmitting station at intervals not exceeding ten (10) stations. A distinctive signal shall be transmitted both at the commencement and completion of each round of the watchman.

b. Shall not have more than 30 transmitting stations connected on a single circuit.

c. Where transmitters of tour systems are connected to circuits serving boxes of either the combined night watch and fire alarm type or manual fire alarm type or both, the number of watchmen reporting over the circuit, and the number of transmitters shall not exceed those given in the following table:

Maximum No. Transmitters Operated by Watchmen	MAXIMUM NO. WATCHMEN REPORTING ON A CIRCUIT		
	Combined Night Watch and Fire Alarm Type		With Tour Systems
50	5	and	0
46	4	"	3
42	3	"	6
38	2	"	9
34	1	"	12
30	0	"	15

334. Manual fire alarm transmitters may be added on any mixed circuit provided the total number of transmitters, including those operated for watch purposes and those for fire alarm purposes only, does not exceed 50. A manual fire alarm transmitter may consist of a single box or group of individual boxes as described in Section 276.

340. AUTOMATIC SPRINKLER ALARM AND SUPERVISORY SYSTEMS

The inspection department having jurisdiction should be consulted in all cases before installation is begun.

341. CENTRAL STATIONS

a. From the central office to the protected property there shall be two separate circuits, one for the water flow alarm, and the other for the supervision features. Manuals shall not be installed on the supervision circuit unless of approved non-interfering pattern.

b. The central office shall, at all times, be able to determine from the signal received the particular feature of the sprinklered property which is out of order and when it has been restored.

This may be accomplished by having separate transmitters for each feature of the service or distinctive signals from the same transmitter, or by a combination of both methods.

342. DEVICES, CIRCUITS, ETC.

a. Shall be so arranged that devices cannot easily be tampered with or removed without giving a signal in the central office.

b. It is strongly recommended that all interior circuits be run entirely in approved conduit.

c. All pipe connections to sprinkler system shall be made in a workmanlike manner, equal in all respects to the regular standard required for sprinkler work.

d. Not more than twenty-five (25) sets of transmitters or not exceeding one hundred (100) breakwheels may be connected on a single circuit.

343. TESTS

Complete and satisfactory tests of all transmitters shall be made by installing companies monthly, and results reported to the inspection department having jurisdiction.

344. MANUAL ALARMS

Where a sprinklered property is provided with either a water flow or supervisory alarm, or both, and has not an approved and properly maintained thermostatic or manual fire alarm system, one or more manual fire alarm boxes may be required to be installed in accordance with Section 270, the number and location of the box or boxes to be as specified by the inspection department having jurisdiction.

SUPERVISORY DETAILS

345. GATE VALVES

a. Connection by means of approved devices shall be made to all gate or other stop valves, under control of the property owner, in feed pipes to sprinklers, including all valves on tanks, fire pump, steam and discharge connections, city main connections, pump suction, post indicator valves, and where necessary, on small valves used in installation of the service. Devices shall be so attached as not to interfere with the operation of the valve nor obstruct the view of indicator or access to stuffing boxes.

b. Attachments on all valves shall give a signal between the first and second revolutions of the hand wheel, tending to move the valve from its proper position; or when valve is not controlled by hand wheel, signal shall be given before the valve has moved ⅛ of the stem movement from its proper position.

Two separate and distinctive automatic signals will be required for the gate valve alarm, one signal to show that a valve has been moved from its normal position, and another distinctive and different signal to show that the valve has been returned to its normal position. The latter signal shall not be given until all valves have been returned to their normal position, or at least to the point where the first or trouble signal was given.

PRESSURE

a. All tanks or other sources of pressure, including steam supply for fire pumps, also pressure on dry-pipe systems, shall be provided with separate and independent attachments, unless otherwise specified by the inspection department having jurisdiction.

Pipe to which supervisory devices are connected shall be provided with a plugged test gauge connection and a stop and relief valve of satisfactory pattern; the whole to be so arranged that pressure on attachment and plugged connection can be released for testing purposes.

b. Pressure tank attachment shall give a high and low pressure signal at ten (10) pounds below and ten (10) pounds above the normal pressure.

c. Steam pressure attachment shall give a low pressure signal at ten (10) per cent. above the minimum operating pressure.

d. Attachment to dry-pipe pressure system shall give a high and low pressure signal at ten (10) pounds variation above or below normal pressure.

e. In special cases and for other pressure sources specific instructions shall be obtained from the inspection department having jurisdiction.

f. Two separate and distinctive automatic signals will be required for pressure alarm, one to show that the pressure has gone below or above the required amount, and another distinctive and different signal to show that the normal pressure has been restored.

347. WATER LEVELS

a. All pressure and surge tanks, gravity tanks, cisterns and reservoirs used as a supply for sprinkler systems shall be equipped with separate and independent attachments unless otherwise specified by the inspection department having jurisdiction.

All devices used for this purpose shall be designed to withstand corrosion and possible mechanical obstructions.

b. Shall give a low water signal in all supplies, except pressure tanks when water drops 12 in. below the required level. Pressure tank device shall give a signal when water drops 3 in. below or rises 3 in. above the required level.

c. Two separate and distinctive automatic signals will be required for water alarm, one to show that water has changed from the required level, and another to show that the proper water level has been restored.

348. TEMPERATURES

a. All tanks, cisterns and reservoirs for sprinkler service in which water might freeze shall be equipped with suitable temperature indicator, located two feet below the required water level.

Note.—Where tanks, cisterns or reservoirs are located in houses in which water might freeze, inspection department having jurisdiction may require suitable temperature indicators for such houses.

b. The indicator shall give a separate and distinctive signal when temperature falls below 40° F. or rises above 160° F., and another distinctive and different signal to show that water has been restored to the proper temperature.

The Classified Building Trade Directory lists just those things used in building construction and equipment. Saves time and worry.

349. FIRE PUMPS

Where automatic fire pumps are used a complete supervision shall be provided in each case, for which special instruction shall be obtained.

350. WATER FLOW ALARM DETAILS

a. Satisfactory and positive connections shall be made by an approved device for indicating the flow of water in the sprinkler system, except that due to waste, surges or variable pressure.

b. The device shall indicate at the central station any leak, or flow of water in the sprinkler system equal to or greater than at the rate of ten (10) gallons per minute. Trouble signal to be distinctive and different from the water flow signal.

c. Where any private local water flow alarm system is in use, the supervisory water flow alarm shall be so arranged that it shall not be dependent upon the operation of or interfered with by trouble on the local private alarm circuit.

360. Signals and reports.

362. Arrangements shall be made to furnish such reports of signals that may be received and in such form as may be required by the inspection department having jurisdiction.

363. DISPOSITION OF SIGNALS

a. Upon receipt of signals referring to matters of purely equipment maintenance, the operating company shall immediately send a runner to investigate and, if possible, see that the trouble is remedied at once.

They shall also notify the property owner by telephone or by the quickest method available.

Written notice shall be given the property owner in all cases.

b. Upon receipt of signals showing flow of water in the system, the central office shall notify the insurance patrol and such other parties as the inspection department having jurisdiction may require.

They shall also despatch a runner to the property.

They shall also notify the property owner by telephone or by the quickest method available.

In addition to which written notices should be given to the property owner.

In all cases where notification is required to parties with whom private lines of communication have not been provided, the quickest available means of communication shall be used.

c. If at any time a combination signal is received which from its nature is indicative of water flow on the premises equipped, such combination signal shall be treated by the central office as a fire alarm.

All manual alarms are to be treated as fire alarms. Fire alarms received from Sprinkler Supervisory service shall be transmitted to the city fire alarm office and patrol, or such other place as required by the inspection department having jurisdiction.

364. SOUNDING DEVICES

If sounding devices are used as parts of the building equipment, they shall comply with section 720.

ARTICLE 4

PROPRIETARY SYSTEMS

400. General.

401. Systems shall comply with the requirements of articles 1, 2 and 3.

402. Watchmen and other employees not required to operate the service shall not be admitted to the station where signals are recorded.

403. A sufficient number of reserve operators shall be kept in training so that the requirements of section 310 may be met under all conditions.

404. The station should be located in a fire-resistive, detached building or properly cut-off room, and in any event shall not be near and exposed to the hazardous parts of the premises protected.

405. Registering devices shall be so designed and arranged as to give a permanent record.

ARTICLE 5

AUXILIARY FIRE ALARM SYSTEMS.

(See Articles 1 and 2, which also supply.)

501. A municipal street box shall not be used as a master box and a special master box shall be installed for each building or plant equipped.

502. The placing of a master box inside a building is not recommended.

503. A municipal fire alarm box circuit shall not extend into the building or plant beyond the master box except by permission of the inspection department having jurisdiction, but a special circuit carrying no public boxes may extend into or through one or more protected establishments.

Note.—See Regulations for Municipal Fire Alarm Systems. Rule 8, paragraphs 1, m and n provide as follows:

1. Not more than 20 boxes shall be connected on one circuit, except that on circuits entirely underground, covering a compact area, a maximum of 30 boxes may be permitted.

m. The placing of boxes in buildings on circuits with street boxes is not generally desirable; when such boxes are installed, they shall be placed as near as practicable to the point of entrance of the circuit and the interior wires shall be installed in rigid conduit, insulated in accordance with article 5 of the National Electrical Code. Reliable means should be provided for disconnecting loops to boxes inside buildings.

n. Boxes which may be tripped by remote manually operated means shall be equal in quality and functional characteristics to other boxes connected in the same municipal circuit, shall be arranged for actuation from but one building, or from a group of buildings of single ownership. Such boxes shall be mounted in or upon or situated in close proximity to the building or some one of the buildings from which it may be tripped, preferably adjacent the

main entrance thereto; and the conductors connecting such boxes with the devices by means of which they may be tripped, shall be enclosed in rigid metal conduits, installed pursuant to rule 503 of the National Electrical Code. Each installation of such boxes shall be subject to inspection and approval by the inspection department having jurisdiction and the Municipal Fire Alarm Authorities.

504. Equipment shall be under the supervision of a responsible person or corporation satisfactory to the municipal authorities and the inspection department having jurisdiction, who shall make all tests and inspections, and have general charge of all alterations or additions.

505. The devices and circuits shall be designed and installed so as to meet successfully the most severe conditions liable to be met in practice, and no change or alteration shall be made in same without written approval.

506. The devices and circuits shall be arranged to receive, record and transmit to fire alarm department, salvage corps or insurance patrol the box number of the building or plant from which an alarm is sent.

507. At intervals not exceeding thirty days, there shall be a complete inspection of the system. One-sixth of the auxiliary boxes shall be tested on each inspection so that all boxes will have been tested every six months.

508. Unless the auxiliary tripping device in the master box is of the automatically restored type, it shall cause the sounding of a trouble bell whenever it requires resetting.

ARTICLE 6

THERMOSTATIC SYSTEMS

(See Articles 1 and 2, which also apply.)

601. Thermostatic systems shall be arranged in conjunction with:

a. A Central Station system.
b. A Proprietary system.
c. As a local system.

602. Thermostatic systems shall be arranged to transmit the box number of the building in which a thermostat has operated and unless floor number is transmitted with alarm, shall automatically register the floor number on an annunciator located as required by the inspection department having jurisdiction.

603. Thermostatic systems shall be so arranged that not more than fifteen building equipments will be connected on a single circuit unless the circuit is entirely underground in which case the number of equipments shall not exceed twenty-five (25), except by special permission of the inspection department having jurisdiction.

604. Transmitters, manual alarm boxes, testing boxes and annunciators shall be of an approved make, and so installed that a considerable jar cannot start their mechanism.

605. Complete and satisfactory tests of all apparatus shall be made quarterly and results reported to the inspection department having jurisdiction.

610. Installation of thermostats.

611. Thermostats shall be placed throughout premises, including inside of all closets, in basements, lofts, elevator wells and under stairs. Special instructions shall be obtained relative to placing them under

large shelves, decks, benches, tables, overhead storage racks, and platforms and inside small enclosures, chutes and cupboards. No portion of the premises shall be exempted without the written consent of the inspection department having jurisdiction.

612. Special instructions shall be obtained from the inspection department having jurisdiction as to the location of high-test thermostats in boiler rooms, heating boxes, skylights, etc.

613. The spacing and distribution of thermostats shall be as determined by the Underwriters' Laboratories and indicated in the List of Inspected Fire Protection Appliances.

614. The distance from wall or partition shall not exceed one-half the distance between thermostats in the same direction.

615. A line of thermostats shall be run on each side of partition. This rule applies to both solid and slatted partitions.

616. Special instructions shall be obtained from the inspection department having jurisdiction relative to location of thermostats under floors and roofs of panel or other unusual construction and for which provision is not hereinbefore made.

617. Thermostats shall be supported in all cases independently of their attachment to the wires, except when cleats or knobs are within one foot of each side of thermostats.

618. Thermostats for hatch closers shall be placed at the top of the elevator wall or hoistway equipped, and on the ceiling below each floor opening in such numbers and so arranged in each case as may be required by the inspection department having jurisdiction.

619. Where automatic sprinklers are to be installed spacing shall be such as to assure operation in advance of the automatic sprinkler.

620. MANUAL ALARM

One or more manual fire alarm boxes of an approved type on this or any other approved system shall be installed.

Note.—Manual boxes may be of a type approved for watchman's time-recording apparatus, Central Station Systems, if desired.

630. Automatic journal alarms.

631. CIRCUITS AND CONNECTIONS

a. Circuits shall be so sub-divided that not more than twenty-five (25) thermostats will be on any one circuit and circuits shall be limited as near as possible to individual buildings.

b. Where there is liability of mechanical injury, conductors shall be encased in approved flexible, armored or iron conduits. Armored or iron conduit shall be securely fastened in place so as to prevent any strain on the conductors.

Where bearings are not fixed, such as tighteners, etc., a special approved flexible stranded conductor shall be used.

c. Thermostats shall be on every bearing not subject to constant inspection where heating will result in fire or where an explosion hazard exists.

d. Thermostats shall be securely fastened in place, but shall be so arranged that they can readily be taken out of the bearings and disconnected without impairing the wiring or connections in any way, and their connections shall be so arranged that journal boxes can be removed and replaced without breaking the wires.

e. Thermostats shall be set to give an alarm at approximately 165° F., except by special consent of the inspection department having jurisdiction, when thermostats may be set at not over 212° F.

632. GONGS

a. When vibrating gongs are used the system shall be so arranged that the failure of any one gong to vibrate can in no way interfere with the proper action of any other gong.

b. There shall be an annunciator or other suitable indicating device in the engine room, with associated gong not less than 6 inches in diameter, arranged to sound code signal or, if code signal is not used, to ring continuously for an alarm.

c. Unless there is, in the engine room, a man constantly available for answering journal alarms, such alarms shall be given on each floor pursuant to Rule 632 b.

633. GENERAL

a. All journal apparatus shall be of an approved type.

b. Permanently fixed ladders shall be provided wherever needed to make bearings readily accessible.

ARTICLE 7

ISOLATED FIRE ALARM SIGNAL SYSTEMS

(See Articles 1 and 2, which also apply.)

700. General.

701. Systems under this caption are for use in factories, workshops, and institutions where occupants are under discipline and control, also for hotels, apartment houses and department stores.

702. All systems in this class shall operate on normally closed electrically supervised circuits.

703. If the inspection departments having jurisdiction requires it, the owner shall furnish:

a. Specifications, wiring diagrams and floor plans in duplicate showing the complete equipment, including the source of electrical energy and the location of fire alarm boxes, sounding devices, exits, stairways, elevators and partitions, the make and type of fire alarm equipment to be used, and a schedule of signals indicating each floor. A copy of the approved plans and specifications will be returned as authority to proceed with the work.

b. A satisfactory guarantee as to the maintenance, operation and efficiency of the system.

704. Fire alarm systems shall be used for no other than fire protective purposes.

705. Automatically operated circuit-breakers and engine stops for shutting down machinery in extremely noisy or hazardous premises may be required connected with and made a part of the fire alarm system. In no case shall such circuit-breakers or engine stops be installed in such a manner as to cut off the power for lighting or for operating elevators.

706. Each circuit shall be so designed that at the minimum effective voltage of the source of current supply, the current density will be at least twenty-five per cent. greater than the current required to transmit

a fire alarm signal; a weaker current to constantly supervise each closed circuit may be approved under conditions acceptable to the inspection department having jurisdiction.

707. The system shall be tested daily. In establishments having a fixed time for starting work, the test shall be made at or immediately before that time. The test signal shall consist of two taps or blasts.

720. Sounding devices.

721. Sounding devices may consist of bells, gongs, whistles or horns of approved types or other approved devices acceptable to the inspection department having jurisdiction.

722. In systems intended to give alarm to occupants, as in factories, workshops and institutions, there shall be installed on each floor of the building one or more sounding devices, sufficient in number and efficiency to be heard plainly throughout the floor above the noise of the machinery and other sounds.

Where floors are divided by fire walls, each section may be deemed a separate floor for the purpose of these requirements.

The number, type and location of sounding devices shall in all cases be acceptable to the inspection department having jurisdiction.

723. Systems consisting of several types of sounding apparatus should be avoided.

Sounding devices of the fire alarm systems shall be distinctive in pitch and quality from all other sounding devices used in the same area.

724. Sounding devices should be placed with their lowest parts about eight feet from the floor.

Whenever there is danger of mechanical injury, the entire device shall be enclosed in a protecting case made of wire netting or perforated metal.

Whenever necessary, hammer rods shall be suitably protected against mechanical injury or derangement by the use of a guard or other suitable means.

725. Electrically controlled whistles or sirens may be required as auxiliary equipment, and shall be installed in a manner acceptable to the inspection department having jurisdiction.

730. Boxes.

731. In addition to the requirements of Section 270 boxes shall comply with the following:

a. For code ringing boxes, not less than three taps shall be given at each revolution of the breakwheel.

Note.—The following suggestion is offered as a guide in the arrangement of the signal code, but it is not to be considered as mandatory.

Single Building, four floors and basements.	4th floor	2-4
	3rd floor	2-3
	2nd floor	2-2
	1st floor	2-1
	Basement	3-1
	Sub-basement, etc.	3-2

b. Boxes used in systems employing electro-mechanical gongs shall be so designed that closed circuit periods will be not less than one-half the intervals between strokes of the gongs.

c. Boxes used in systems in which whistles, vibrating bells or horns are employed shall be so timed that the sounding devices will give the coded signal clearly.

740. AUTOMATIC EQUIPMENT

Approved thermostatic and automatic sprinkler systems arranged automatically to set in motion transmitting devices in connection with the manual fire alarm systems covered by the foregoing rules may be allowed by special permission of the inspection department having jurisdiction.

750. Current supply.

751. In addition to the requirements of Section 230, the current supply shall comply with the following:

a. Fuses not less than 50 per cent. and not more than 100 per cent. in excess of normal working load or maximum signaling load, whichever is the greater, shall be provided at battery terminals.

b. Primary batteries shall be placed in substantial well-fitted cabinets, elevated not less than 6 in. and not more than 6 ft. above the floor and located in a clean, dry place where the temperature will not fall below 40° F. nor rise above 100° F.

c. Cabinets shall be provided with shelves of approved materials, properly fastened and secured to prevent sagging; if of wood, they shall be not less than ⅞ in. in thickness.

Supports for dry battery cells shall be so constructed that it will be impossible for the cells to come in contact with each other or with a metal enclosure.

Cabinets for liquid batteries shall be so constructed that the condition of the elements may be observed without disturbing the cells.

d. Metal cabinets shall be of approved type, constructed of sheet iron or steel not less than No. 14 U. S. metal gauge.

Doors shall be provided with lock and key, and kept locked.

The interior and the exterior of metal cabinets shall be painted with two coats of approved acid and alkali-proof compound; each coat to be thoroughly dried before the next is applied. Baked enamel will be accepted in lieu of the above.

e. Wooden battery cabinets shall be constructed of the best grade of kiln-dried wood not less than ⅞ in. thick. Doors shall be provided with a suitable lock and kept locked.

Wood cabinets shall be painted on the interior with two coats of asphaltum compound, and on the exterior with two coats of lead paint, varnish, asphaltum or other approved compound.

ARTICLE 8

MISCELLANEOUS

810. Watchmen's time-recording apparatus.

811. LOCAL OR PRIVATE STATIONARY SYSTEMS

a. The clock used shall run at least eight days without rewinding, and shall be so encased that watch records cannot be seen without opening door, and so arranged that opening or closing of door will make a distinctive record by mechanical means.

b. Records shall be made by perforating paper, and the puncturing device shall be so arranged that it is not liable to stick in, adhere to, or tear the paper.

c. Magnetos shall be used for the transmission of signals, shall be of an approved type, and may be either portable or fixed at each station.

Note.—Where individual station recording clocks are provided, the recording apparatus may be operated by an approved mechanical device.

d. Stations shall be placed as required by the inspection department having jurisdiction.

812. PORTABLE WATCH CLOCKS

a. The clock used shall run for at least 48 hours without rewinding, shall be substantially mounted and strongly encased. It shall be made so that the watch record dial cannot be seen without opening the case and so that it cannot be opened without puncturing or cutting the dial.

b. Records shall be made by embossing or puncturing the dial and shall be easily legible. Dial shall be of sufficient size so that time at which the record is made can be accurately determined.

c. Stations shall be located as required by the inspection department having jurisdiction and fixed so that they cannot be removed without giving evidence of removal.

Keys shall be made so that they are difficult to duplicate, and shall be of a pattern susceptible of variations tending to reduce the probability that a set of keys fitted for one clock will operate other clocks.

820. Local automatic sprinkler alarms.

821. Local automatic sprinkler alarms shall be arranged to give signals at points designated by the inspection department having jurisdiction. These connections should be chosen from the following, choice being made in the order given:

a. Fire Alarm Headquarters.

b. Fire department house, having men stationed therein, within one-half mile, if with horse-drawn apparatus or within one mile if automobile apparatus.

c. Fire department house having "bunk men" at night, within one-half mile if with horse-drawn apparatus or within one mile if automobile apparatus.

d. House of chief engineer or foreman of local fire department, when either is within 1200 feet.

e. House of engineer or fireman of protected establishment when either is within 1200 feet.

f. House of owner or superintendent of protected establishment, when either is within 1200 feet.

g. House of regular employee, other than those above mentioned, if within 1200 feet.

822. When it is impossible to obtain any of the preceding (§821) special instructions shall be obtained.

823. Gongs shall be of the continuous acting or the vibrating type, not less than 6 in. in diameter.

824. Operating features of the system shall be tested every month.

825. No means shall be provided for silencing water flow alarms except in such a manner that the act of silencing the normally active bell will positively transfer the trouble signal to another bell or alarm signal located in the quarters of some responsible person.

Regulations of the National Board of Fire Underwriters for the Construction and Installation of

OIL BURNING EQUIPMENTS

and for the Storage and Use of Oil Fuels in Connection Therewith

WHERE AN ATTENDANT IS CONSTANTLY ON THE PREMISES

DOMESTIC OIL BURNING EQUIPMENTS

Recommended by the National Fire Protection Association

EDITION 1925

PREFACE

On account of the increasing demand for the use of oil fuel in the built-up sections in cities and in outlying sections where heretofore it was considered impractical to provide any considerable amount of underground storage on account of ground water or rock formation, it became necessary to provide regulations covering such different classes of storage as may be required by any particular local condition. Accordingly the rules contained herein provide, with reference to storage, for four distinct classes of installation:

Outside underground storage tanks;
Under the building storage tanks;
Above ground storage tanks (diked) with outside underground service tanks;
Inside the building storage tanks.

So far as storage is concerned each different class of installation introduces a different degree of hazard; the outside underground storage is the safest installation possible and the inside the building storage the most hazardous.

These rules are intended to provide general requirements for the construction and installation of oil fuel storage tanks, their auxiliaries, piping, heaters and pumps. The success and degree of safety of any particular class of system is dependent on the design, workmanship and supervision of installation, maintenance of the equipment and methods of operating. Before an equipment is installed or before an existing equipment is remodeled, the plans should be submitted for approval to the Inspection Department having jurisdiction.

These plans should be drawn to an indicated scale; give relative location of buildings, tanks, pumps, pipes, etc.; show sectional elevation of the buildings (including lowest floors or pits) that limit allowable storage capacity, tanks, their fittings and devices, dikes, pumps, filling lines, burners, etc. Specifications based on the following rules should accompany the plans.

INTRODUCTION

Oil-burning equipments of this class are intended for fuels having a flash point of 150° F. and above, closed cup tester, and shall be operated only when a competent attendant is constantly on the premises.

In determining the flash point, either the Elliott, Abel, Abel-Pensky or Tag Closed Testers shall be used, but the Tag Closed Tester (standardized by the United States. Bureau of Standards) shall be authoritative in case of dispute. All tests shall be made in accordance with the methods of tests as adopted by the American Society for Testing Materials.

Storage tanks should be placed underground to obtain the greatest measure of safety. Where this cannot be done and tanks are necessarily located within the building, or above ground, such an arrangement is considered more hazardous.

Above-ground storage or supply tanks may be permitted only outside of closely built districts.

SECTION I. CONSTRUCTION OF TANKS

Underground Tanks

1. MATERIALS OF CONSTRUCTION

a. Tanks shall be constructed of galvanized steel (basic), open hearth steel or wrought iron of a minimum gauge (U. S. Standard) depending upon the capacity, as given in Table I.

For liquids heavier than 35° Baumé tanks may be of concrete.

TABLE I

Capacity (Gallons)	Gauge	Minimum Thickness of Material Lbs. per Sq. Ft.
1 to 285	16 gauge	2.50
286 to 560	14 gauge	3.125
561 to 1,100	12 gauge	4.375
1,101 to 4,000	7 gauge	7.50
4,001 to 12,000	¼ inch	10.00
12,001 to 20,000	5/16 inch	12.50
20,001 to 30,000	⅜ inch	15.00

For tanks of 1,100 gallons and more a tolerance of 10 per cent. in capacity may be allowed. Tanks of open hearth steel or wrought iron thinner than No. 7 gauge shall be galvanized. If adequate internal bracing is provided, tanks from 12,001 to 30,000 gallons capacity may be built of ¼ inch plate.

2. JOINTS AND CONNECTIONS

All joints shall be riveted and caulked, brazed, welded or made tight by some equally satisfactory process. Tanks shall be tight and sufficiently strong to bear without injury the most severe strains to which they may be subjected in practice. Shells of tanks shall be properly reinforced

where connections are made, and all connections made through the top of tank above the liquid level.

Note: Tanks for systems under pressure shall be designed for four times the maximum working pressure, and tested to twice the maximum working pressure.

3. RUST PROOFING

All tanks shall be thoroughly coated on the outside with tar, asphaltum or other suitable rust-resisting material, dependent upon the condition of soil in which they are placed. Where soil contains corrosive substances, special protection may be required.

4. VENTING OF TANKS

a. An open or automatically operated galvanized iron vent pipe without trap and draining to the storage tank shall be provided. The lower end of the vent pipe shall not extend through the top into the tank for a distance of more than one inch.

b. Vent openings shall be screened, preferably by 40x40, but not less than 30x30, cone-shaped, non-corrodible wire mesh or its equivalent, and shall be of sufficient area to permit proper inflow of liquid during the filling operation, and in no case less than 1 inch in diameter, except those automatically operated. Screens shall be accessible for examination and removal. Vent pipes shall be provided with weatherproof hoods, and terminate outside of buildings twelve feet above top of fill-pipe, or, if tight connection is made in filling line, to a point one foot above the level of the top of the highest reservoir from which the tanks may be filled, and preferably not less than three feet, measured horizontally and vertically, from any window or other building opening.

Where a battery of tanks designed to hold the same class of liquids is installed vent pipe may be run into a main header. Individual vent pipes shall, however, be screened between tank and header, and connection to the header shall not be less than one foot above the level of the top of the highest reservoir from which the tanks may be filled.

5. FILLING PIPE

End of filling pipe in tank shall be sealed by a trap or the pipe extended into the tank to a point below the lower end of the suction pipe, and when installed in the vicinity of any door or other building opening shall be as remote therefrom as possible so as to prevent liability of flow of oil or vapor through building openings; terminal shall be outside of building in a tight, incombustible box or casing, so designed as to make access difficult by unauthorized persons.

6. MANHOLE

Manhole covers shall be securely fastened in order to make access difficult by unauthorized persons. No manhole shall be used for filling purposes.

7. TEST WELL OR GAUGING DEVICE

(See paragraph 31.)

8. SETTING OF TANKS

a. Tanks shall be buried underground with top of the tanks not less than two feet below the surface of the ground, and below the level of any piping to which the tanks may be connected, except that in lieu of the two feet cover tank may be buried under 12 inches of earth and a cover of reinforced concrete at least 6 inches in thickness provided, which shall extend at least one foot beyond the outline of tank in all directions; concrete slab to be set on a firm, well-tamped earth foundation. Tanks shall be securely anchored or weighted in place to prevent floating where special conditions make it necessary.

Where a tank cannot be entirely buried, it shall be covered over with earth to a depth of at least 2 feet with a recommended slope on all sides of not less than 3 to 1, but under no circumstances shall such slope be less than 1½ to 1, depending on the angle of repose of the earth. Such cases shall also be subject to such other requirements as may be deemed necessary by the inspection department having jurisdiction.

If tank cannot be set below the level of all piping to which it is connected, satisfactory arrangements shall be provided to prevent siphoning or gravity flow in case of accident to the piping.

Note: For small installations where pipe lines are 1 inch or less, provisions which will break the siphon at time of fire, such as an air inlet held close with fusible metal, located at top of bend, may be acceptable. Weighted foot valves; enlarged pipe section on discharge side of siphon; or air inlets at top bends controlled by pump pressure, are provisions which may be acceptable in any size piping, depending upon the elevation of the tank, and upon specific approval of the inspection department having jurisdiction.

b. Tanks shall be set on a firm foundation and surrounded with soft earth or sand well tamped in place, or encased in concrete as outlined in paragraph 14 (d).

c. When located underneath a building, the tanks shall be buried with top of tanks not less than 2 feet below the level of the floor. The floor immediately above the tanks shall be of reinforced concrete at least 9 inches in thickness, or some other type of construction of equivalent strength and fire resistance, extending at least one foot beyond the outline of tanks in all directions, and provided with ample means of support independent of any tank.

ABOVE GROUND TANKS

9. MATERIAL AND CONSTRUCTION OF TANKS

a. Tanks, including top, shall be constructed of open hearth steel or wrought iron of a thickness depending upon the capacity and to be figured in accordance with the following table or formulae. No open tank shall be used. For liquids of 35° Bé, or heavier, tanks may be constructed of concrete in accordance with the Regulations for the Design and Construction of Concrete Fuel Oil Storage Tanks.

(1) HORIZONTAL OR VERTICAL TANKS NOT OVER 1,100 GALLONS CAPACITY

Capacity (Gallons)	Minimum Thickness of Material
1 to 60	18 gauge
61 to 350	16 gauge
351 to 560	14 gauge
561 to 1,100	12 gauge

(2) HORIZONTAL TANKS OVER 1,100 GALLONS CAPACITY

Tanks of this class shall be of such material and so constructed as to have a factor of safety of at least 2.5 with hydrostatic head figured with water. The minimum thickness of shell or head shall be 3/16 in. (7 U. S. G.).

The thickness of shell plates shall be figured with the following formula.

$$t = \frac{P \times r \times F}{T \times E}$$

t = thickness of plate in inches.
P = working pressure in pounds per square inch.
r = radius of shell (inside) in inches.
F = factor of safety (taken as 2.5).
T = tensile strength of plate in pounds per square inch.
E = efficiency of longitudinal riveted joints.

(3) VERTICAL TANKS OVER 1,100 GALLONS CAPACITY

Tanks of this class shall be of such material and so constructed as to give a factor of safety of at least 2.5.

The minimum thickness of shell or bottom shall be 3/16 in. The minimum thickness of roof shall be ⅛ in.

The thickness of plates shall be figured in accordance with the following formula.

$$t = \frac{2.604 \times H \times D \times F \times S}{T \times E}$$

t = thickness of plate in inches.
H = height of tank in feet above the bottom of the ring under consideration.
D = diameter of the tank in feet.
F = factor of safety (taken as 2.5).
S = specific gravity of liquid taking water equal to 1.
T = tensile strength of plate in pounds per square inch.
E = efficiency of vertical joint in ring under consideration.

The tensile strength of the steel shall be taken as 55,000 pounds per square inch, while the shearing strength of rivets shall be taken as 40,000 pounds per square inch.

b. Joints—See paragraph 2.

c. Rust proofing—See paragraph 3.

10. ROOFS OR TOPS

No wooden or loosely fitting metal roofs or tops shall be permitted. Roof or top shall be without unprotected openings; shall be firmly and permanently joined to the tank, and all joints made as noted in paragraph 2.

11. VENTING OF TANK

a. A permanently open vent conforming to article 4 shall be provided.

b. Each tank over 1,000 gallons in capacity shall have vent openings screened preferably by 40x40, but not less than 30x30, non-corrodible wire mesh or its equivalent. Screens shall be accessible for examination and removal.

12. SETTING OF TANKS

Tanks with bottom more than one foot above the ground shall have firm foundation and supports of fire-resisting materials, except wooden cushions. The storage of combustible material within 10 feet of any tank is prohibited.

Note: Unprotected steel is not satisfactory as a support for tanks.

13. EMBANKMENTS AND DIKES

a. In locations where above-ground tanks are liable in case of breakage or overflow to endanger surrounding property, each tank shall be protected by an embankment or dike. Embankments or dikes shall be made of clay-core cinder-fill; earthwork; masonry or approved concrete. Such dikes, when constructed of clay-core, cinder-fill or earthwork, shall have a capacity one and one-half times that of the tank, and if constructed of masonry or approved concrete may have a capacity equivalent to but not less than that of the tank. Earthwork embankments shall be firmly and compactly built of good earth from which stones, vegetable matter, etc., have been removed, and shall have a flat section at the top of not less than three feet and a slope of at least 1½ to 1 on both sides. Small tanks with capacities of not over 25,000 gallons each may be grouped and a dike built around the group of tanks.

b. Embankments or dikes shall be continuous, with no openings for piping or roadways. Piping shall preferably be laid over or under embankments.

TANKS INSIDE BUILDINGS

Inside storage is regarded as much more hazardous than outside storage. Where used the following requirements shall be rigidly applied:

14. SETTING AND ENCLOSING OF TANKS

a. Tanks shall not be located above the lowest story, cellar or basement of building.

b. Tanks shall be located below the level of any piping to which they may be connected, or if this is impracticable, satisfactory arrangements shall be made to prevent siphoning or gravity flow in case of accident to the equipment or piping. Refer to note following 8 a for suggested methods for the prevention of siphoning.

c. Tanks shall be set on a firm foundation (and those exceeding 2,500 gallons capacity shall be supported independently of the floor construction) designed to carry the load.

d. Steel tanks of over 275 gallons capacity shall be completely enclosed with reinforced concrete not less than 12 inches in thickness or its equivalent, with at least a six-inch space on sides between tank and concrete filled with sand or well tamped earth, and with 12 inches of sand on top of tank, either between tank and the concrete slab or above the concrete slab.

Note: No open spaces immediately around tanks shall be permitted, as such spaces may collect explosive mixtures of vapor and air.

e. Concrete tanks shall be completely enclosed with a heat insulation of reinforced concrete not less than 8 inches in thickness, with at least a 6 inch space on sides between tank and concrete insulation filled with sand or well tamped earth, except that for top of tank an insulation of 12 inches of sand without concrete covering shall be deemed sufficient.

f. Walls of concrete tanks shall be constructed independently of and not in contact with the building walls.

15. MATERIAL AND CONSTRUCTION OF TANKS

See paragraphs 1 a and 2.

16. VENTING OF TANKS

See paragraphs 4 and 11 b.

SECTION II. LOCATION AND CAPACITY OF TANKS

17. UNDERGROUND STORAGE

Tanks should preferably be located at least 50 feet from important buildings. When this cannot be done the limit of individual tank capacity permitted shall be dependent on the location of tanks with respect to adjacent buildings, as follows:

MAXIMUM CAPACITY OF TANKS FOR UNDERGROUND STORAGE

Location	Capacity
If top of tank is lower than all floors, basements, cellars or pits of buildings.	
(a) Within a radius of 50 feet,	Unlimited
(b) Within a radius of 40 feet,	500,000 gals.
(c) Within a radius of 30 feet,	200,000 gals.
(d) Within a radius of 25 feet,	150,000 gals.
(e) Within a radius of 20 feet,	100,000 gals.
(f) Within a radius of 10 feet,	75,000 gals.
(g) If within 10 feet of any building and the top of the tank is above the lowest floor, basement, cellar or pit, of the building,	50,000 gals.

18. ABOVE-GROUND STORAGE

a. The relation between capacity of individual tanks and the permissible distance from other property is shown in the following table:

Capacity of Tanks (Gallons)	Minimum Distance to line of Adjoining property or Nearest Building (Feet)
750	5
1,100	10
3,000 or less	20
21,000 " "	25
31,000 " "	30
45,000 " "	40
64,000 " "	50
80,000 " "	60
128,000 " "	75
200,000 " "	85
266,000 " "	100
400,000 " "	150
666,000 " "	250
1,333,000 " "	300
2,666,000 " "	350

b. For tanks of over 400,000 gallons capacity, a minimum distance of 175 feet to adjoining property or nearest building may be permitted, provided that an approved type of extinguishing system is installed for the tank and covering other parts of the yard or system.

c. For tanks permitted from 50 feet and up to 175 feet of building or property line, the capacity may be increased 33 per cent. if the tank is provided with an approved extinguishing system.

d. The minimum distance from tanks to adjacent tanks shall conform to the following table:

Capacity of Tank (Gallons)	Minimum Distances to any other tank
300 or less	3 feet
500 " "	3 "
1,000 " "	3 "
8,000 " "	3 "
12,000 " "	3 "
18,000 " "	3 "
24,000 " "	5 "
30,000 " "	10 "
48,000 " "	10 "
75,000 " "	13 "
100,000 " "	15 "
100,000 to 2,500,000	One tank diameter

19. HIGH WATER

Tanks shall be so located as to avoid possible danger from high water.

20. STREAMS WITHOUT TIDE

When tanks are located on a stream without tide, they shall, where possible, be down stream from burnable property.

21. PERMANENTLY SET STORAGE TANKS INSIDE BUILDINGS

a. In ordinary buildings the nominal gross capacity of tanks shall not exceed 5,000 gallons.

b. In fire-resistive buildings the nominal gross capacity of tanks shall not exceed 10,000 gallons.

c. In any building, if in a fire-resistive or detached room cut off vertically and horizontally in an approved manner from other floors of the main building, the nominal gross capacity of tanks shall not exceed 50,000 gallons, with an individual tank capacity not exceeding 25,000 gallons, provided the insulating sand specified under paragraphs 15 c, d and e shall be increased to 12 inches on sides and 18 inches on top.

SECTION III. PIPING—GENERAL REQUIREMENTS

22. CROSS CONNECTIONS

Cross connections permitting gravity flow from one tank to another shall be prohibited. This, however, shall not be construed as prohibiting the filling of an outside service tank by gravity from a storage tank, pro-

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vided filling is through an open connection located within a dike surrounding the service tank, and provided further that such dike shall have a capacity equal to 1½ times the capacity of the tank being filled.

23. WORKMANSHIP

All pipe connections to tanks and other oil-containing or -using devices shall be made in a substantial, workmanlike manner.

24. TYPE OF MATERIAL

All piping shall be of the standard full weight wrought iron or steel type for working pressures less than 100 pounds; for working pressures in excess of 100 pounds, extra heavy pipe and fittings shall be used. No pipe less than one-half inch internal diameter will be permitted.

25. INSTALLATION

a. Piping shall be run as directly as possible without sags and so laid that where possible pipes pitch toward the supply tank without traps; provision shall be made for expansion, contraction, jarring and vibration.

b. All connections of air lines to burners shall be made on the upper side and shall extend upward for a distance of at least 12 inches.

26. TESTS

Piping after installation shall be tested and proven tight at the following pressures:

Working Pressure	Test Pressure
0-10 lbs.	20 lbs.
10-100 lbs.	150 lbs.
Above 100 lbs.	50% in excess of working pressure

Test shall continue for 30 minutes.

27. UNIONS

No right and left couplings shall be used, and unions shall be of an approved type.

28. PROTECTION TO PIPING

a. Piping between any separate oil-containing or -using part of the equipment shall be as far as practicable laid outside of the building, underground, and properly protected against corrosive action; if necessarily inside, it shall preferably be laid in a trench with proper metal cover; if on floor or subject to mechanical injury, it shall be protected.

b. Pipes leading to the surface of the ground or above the floor, particularly risers to furnaces, shall be protected against injury and rigidly supported to prevent vibration. Fill and vent pipe shall also be protected.

c. Riser pipes from the oil supply lines to burner fittings shall be not less than 1 inch in size.

29. OUTSIDE PIPING

a. All outside piping shall be laid in solid earth, or in a trench. Oil pipes shall not be located near nor in the same trench with other piping, excepting steam lines for heating. Propping the pipes on wooden blocks shall be avoided.

b. Openings for pipe through outside walls below the ground level shall be made oil-tight and securely packed with flexible material.

30. VALVES

a. All valves shall be of an approved type.

b. Where strainers and pump are not a part of a burner unit shut-off valves shall be provided on both sides of any strainer which may be installed in pipe lines; in discharge and suction lines to pump; and in branch lines near burners. An outside readily accessible valve shall be provided on all supply lines entering buildings. In installations where the pump is located at a distance from the burners, it is advised that a remote control device be installed so that the supply of oil can be cut off at the pump in case of accident. In systems where burner, pump and strainer are assembled as a unit a suitable shut-off valve shall be provided on the inlet side of the strainer.

c. A check valve of an approved type shall be installed in each air line where an enclosed type of burner is used.

d. A pressure relief valve shall be installed in supply line to burners and so arranged as to return surplus oil to supply tank.

e. The use of automatic shut-off valves for the oil supply is recommended.

f. In systems where either steam or air is used for atomizing, the oil and atomizing supply shall be interlocked in an approved manner so that in case of interruption of the atomizing supply, the oil will immediately be cut off.

31. OIL LEVEL INDICATING DEVICE

A test well or gauging device shall be installed, and so designed as to prevent the escape of oil or vapor when closed. Top of well or gauging device shall be kept locked when not in use.

32. STRAINERS

Suitable strainers shall be installed in the suction line. Large basket strainers are recommended in the receiving or filling line of storage tank to remove dirt and foreign matter.

SECTION IV. HEATING

33. HEATING OF TANKS

a. Where it is necessary to heat oil in storage tanks in order to handle it, the oil shall not be heated to a temperature higher than 40° F. below the flash point, closed cup.

b. Heating shall be done by means of properly installed coils within the tank, using only steam or water. Thermostatic control and thermometer shall be provided for all heating devices.

34. HEATERS, OTHER THAN THOSE FOR TANKS

a. Heaters shall be of substantial construction; all joints shall be made oil-tight.

b. Only steam, water or approved electrical heaters shall be used for preheating.

c. Heater shall be by-passed so that in warm weather it will not be under constant pressure while not in use.

SECTION V. BURNERS

35. BURNERS

a. The burner mechanism shall be so designed as to not enlarge the orifice, and so that the needle valve cannot be unscrewed and removed in operating.

b. The burner shall be properly supported, if necessary independently of the piping.

SECTION VI. DAMPERS

36.

Attention is called to the serious hazard arising should dampers in the flues to the stacks be closed or induction fans be inoperative at the time the oil is being ignited. Owing to the liability of explosion the operator must assure himself positively that all vents are clear and open before starting the fire.

SECTION VII. PUMPING SYSTEMS

37.

Oil shall be pumped from tank to burners. Systems where burners are supplied by gravity or pressure on tank are prohibited.

Note: This shall not be construed as prohibiting gravity and pressure feed to the same extent as permitted in the Regulations for Domestic Oil Burning Equipments.

38. PUMPS

a. Pumps shall be of an approved design and secure against leaks. They shall be installed in duplicate where fire protection equipment is dependent on the use of fuel oil for heating or steam, or where necessity for continuous operation of plant makes it impracticable to shut down for repairs.

b. They shall be located in a room off from oil-burning devices and provided with entrance which can be reached without passing through room where burners are located; if this is not practicable, provision shall be made for remote control.

c. Pumps used in connection with the supply and discharge of storage tanks shall be located outside embankment walls, and at such a point that they will be accessible at all times, even if the oil in the tank or reservoir should be on fire.

SECTION VIII. DIAGRAM OF PIPING

39.

The contractor installing the fuel oil equipment shall furnish copies of diagrams showing all of the main oil lines and controlling valves, and these diagrams shall be posted where the oil system is installed, and also at some other point which will be accessible in case of fire where the fuel oil equipment is located.

SECTION IX. FIRE PROTECTION

40.

It is recommended that approved extinguishing devices of a type suitable for use on oil fires should be provided in connection with oil-burning equipments. These should be hand extinguishers or wheeled extinguishers, depending on the size of the equipment. (See Regulations for First Aid Fire Appliances.)

REGULATIONS

FOR THE CONSTRUCTION AND INSTALLATION OF DOMESTIC OIL BURNING EQUIPMENTS

and for the Storage and Use of Oil Fuels in Connection Therewith

Note: These regulations do not apply to oil burning devices employing a wick.

PREFACE

The safest type of oil burning system for domestic use is that in which all piping and the tops of tanks are located below the level of the burner base and in which the supply of oil to the burner is so controlled that breakage of any pipe or ignition failure will not result in a continuous discharge of oil into the building.

Systems employing gravity, pressure or automatic pump feed without automatic control to prevent hazardous abnormal discharge of oil may introduce a greater hazard and should not be permitted unless installed in full compliance with the following regulations.

REGULATIONS

Oil used for fuel under these rules shall be a topped or distilled oil having a flash point of not less than 100° F., closed cup.

In determining the flash point, either the Elliott, Abel, Abel-Pensky or Tag Closed Testers shall be used, but the Tag Closed Tester (standardized by the United States Bureau of Standards) shall be authoritative in case of dispute. In such cases the tests shall be made in accordance with the methods of tests as adopted by the American Society for Testing Materials.

Only oil burning systems approved by the Inspection Department having jurisdiction shall be used.

1. LOCATION OF STORAGE TANKS

a. Storage tanks shall preferably be located outside, underground, with top of tank below the level of the burner. Where conditions are such that

top of tank is above the burner, adequate provisions to prevent siphoning shall be provided.

Note: For small installation where pipe lines are 1-inch or less, provisions which will break the siphon at time of fire, such as an air inlet held closed with fusible metal located at top of bend, may be acceptable. Weighted foot valves; enlarged pipe section on discharge side of siphon; or air inlets at top bends controlled by pump pressure, are provisions which may be acceptable in any size piping, depending upon the elevation of the tank, and upon specific approval of the inspection department having jurisdiction.

b. When located inside building or above ground, the aggregate capacity of the tanks used in connection with the system shall not exceed 275 gallons.

2. MATERIAL AND CONSTRUCTION OF TANKS

a. Tanks shall be constructed of galvanized steel, open hearth steel or wrought iron of a minimum gauge (U. S. Standard) depending upon the capacity as given in Table 1.

For liquids heavier than 35° Baumé, tanks may be of concrete.

TABLE 1

Capacity (Gallons)	Gauge	Minimum Thickness of Material— Lbs. per sq. ft.
1 to 285	16 gauge	2.50
286 to 560	14 gauge	3.125
561 to 1,100	12 gauge	4.375
1,101 to 4,000	7 gauge	7.50
4,001 to 12,000	¼ inch	10.00
12,001 to 20,000	5/16 inch	12.50
20,001 to 30,000	⅜ inch	15.00

For tanks of 1,100 gallons and more, a tolerance of 10 per cent. in capacity may be allowed. Underground tanks of open hearth steel or wrought iron thinner than No. 7 gauge shall be galvanized. If adequate internal bracing is provided, tanks from 12,001 to 30,000 gallons capacity may be built of ¼ inch plate.

b. All joints shall be riveted and caulked, brazed, welded or made tight by some equally satisfactory process. Tanks shall be tight and sufficiently strong to bear without injury the most severe strains to which they may be subjected in practice. Shells of tanks shall be properly reinforced where connections are made, and all connections made through the top of tank above the liquid level.

Note: Tanks for systems under pressure shall be designed for four times the maximum working pressure, and tested to twice the maximum working pressure.

c. Underground tanks shall be thoroughly coated on the outside with tar, asphaltum or other suitable rust-resisting material, dependent upon the condition of the soil in which they are placed. Where soil contains corrosive substances, special protection may be required.

d. Inside or above ground and auxiliary tanks shall be coated with a good quality of rust-resisting paint; the bottom surfaces preferably being coated with tar or asphaltum or the equivalent.

3. VENTING OF TANKS

a. An open or automatically operated galvanized iron vent pipe without trap and draining to the underground storage tank shall be provided.

b. Inside or above ground and auxiliary tanks shall be provided with open vent pipes.

c. All vent pipes shall be of ample size to prevent abnormal pressure in case of fire or when filling, in no case to be less than 1-inch pipe size; such vent pipes shall have the lower end extend through the top into the tank for a distance of not more than 1 inch. Outer ends of vent pipes shall be provided with weatherproof hoods, screened to prevent obstruction by insects and terminating at a point outside of building preferably not less than 3 feet, measured horizontally or vertically from any window or other building opening.

4. FILLING PIPE

All filling pipes shall terminate outside of buildings and when installed in the vicinity of any door or other building opening shall be as remote therefrom as possible so as to prevent liability of flow of oil or vapor through building openings; terminal shall be provided with a metal cover or cap which may be locked.

5. MANHOLE

Manholes, if used, shall have covers securely fastened in order to make access difficult by unauthorized persons. No manhole shall be used for filling purposes.

6. OIL LEVEL INDICATING DEVICE

A test well or gauging device shall be installed on all tanks and be so designed as to prevent escape of oil or vapor within the building. Gauges employing glass parts, the breakage of which would permit the escape of oil or vapor, shall not be used. Test wells or gauges located outside of buildings shall be locked to avoid tampering.

7. SETTING OF TANKS

a. Tanks shall be buried underground with top of the tanks not less than 2 feet below the surface of the ground, and below the level of any piping to which the tanks may be connected, except that in lieu of the 2 feet cover tank may be buried under 12 inches of earth and a cover of reinforced concrete at least 6 inches in thickness provided, which shall extend at least 1 foot beyond the outline of tank in all directions; concrete slab to be set on a firm, well-tamped earth foundation. Tanks shall be securely anchored or weighted in place to prevent floating, where special conditions make it necessary.

Where a tank cannot be entirely buried, it shall be covered over with earth to a depth of at least 2 feet with a recommended slope on all sides of not less than 3 to 1, but under no circumstances shall such slope be less than 1½ to 1, depending on the angle of repose of the earth. Such cases shall also be subject to such other requirements as may be deemed necessary by inspection department having jurisdiction.

If tank cannot be set below the level of all piping to which it is connected, satisfactory arrangements shall be provided to prevent siphoning or gravity flow in case of accident to the piping.

Note: Refer to note following Rule 1 a for suggested methods for the prevention of siphoning.

b. Underground tanks shall be set on a firm foundation and surrounded with soft earth or sand well tamped in place.

c. Tanks having a capacity of not to exceed 1,500 gallons when installed under buildings, shall be surrounded with soft earth or sand well tamped in place, and the floor immediately above the tank shall be of reinforced concrete at least 4 inches in thickness, capable of withstanding a uniformly distributed load of 250 lbs. per sq. ft.; reinforcement shall extend at least 12 inches on all sides of tank.

Note: For installation of tanks having a capacity in excess of 1,500 gallons, see Rule 8 c of the preceding Regulations for the Construction and Installation of Oil Burning Equipment, Other than Domestic.

d. Inside storage, gravity and auxiliary pressure tanks shall be provided with securely attached substantial incombustible supports, and be securely bolted to basement floor or otherwise secured to avoid strains on piping, and shall not be located within 10 feet, measured horizontally from any fire or source of flame.

8. GRAVITY AND PRESSURE TANKS

a. Auxiliary supply tanks may be of the gravity or pressure type if suitable automatic safeguards to prevent abnormal discharge of oil at the burner are provided. No such tank shall have a capacity sufficient for more than one day's supply and in no case shall exceed 60 gallons.

b. If located within a building, gravity tank shall not be within 5 feet or pressure tank within 10 feet, measured horizontally from any fire or flame.

c. Gravity or pressure tank shall be substantially and rigidly installed on incombustible supports in such a manner as to insure protection against mechanical injury.

Auxiliary pressure tanks shall be designed for six times the maximum working pressure and be tested and proven tight at twice the maximum working pressure; working pressure shall not exceed 50 lbs. Pressure tanks shall be provided with a reliable pressure gauge and an automatic relief valve piped to discharge outside of building.

9. FILLING OF AUXILIARY TANKS

a. Unless filled as specified in Rule 4 auxiliary tanks shall be filled by pumping from storage tanks.

b. Tank shall be provided with an overflow connection draining to storage tank. Overflow pipe shall be not less than one size larger than supply pipe from pump.

c. The overflow pipe of an auxiliary gravity tank shall not be provided with valves or obstructions; but overflow pipe of auxiliary pressure tank shall be provided with inter-connected valves or other means for automatically venting tank when filling.

10. PUMPS

a. Oil pump used in filling auxiliary tank from the main storage tank shall be of approved type, secure against leaks, with check valves located as close to pump as convenient. Pumps shall be rigidly fastened in place.

b. Automatic pumps not an integral part of the oil burner shall be of an approved type preferably provided with automatic means for preventing continuous discharge of oil in case of pipe breakage.

11. PIPING

a. Standard, full weight, wrought iron, steel or brass pipe with substantial fittings shall be used and shall be carefully protected against mechanical injury in a manner satisfactory to the Inspection Department having jurisdiction. In all piping systems proper allowance shall be made for expansion and contraction, jarring and vibration.

All piping shall be separated from electric wires not enclosed in approved conduit, raceways and armored cable, by some continuous and firmly fixed non-conductor creating a permanent separation, as provided in the National Electrical Code.

The use of tubing of any kind is prohibited.

b. Supply pipe shall be not less than one-fourth inch in diameter iron pipe size, and when oil is pumped to the burner, return pipes shall be at least the same size.

c. Pipe connections to tanks shall be suitably reinforced and proper allowance made for expansion and contraction, jarring and vibration.

d. Openings for pipes through masonry walls below the ground level shall be made oil-tight and securely packed with flexible material.

e. All connections shall be made perfectly tight with well fitted joints. Unions shall be used at burners to facilitate removal. All unions shall be of approved type, having conically faced joint, obviating the use of packing or gaskets.

f. Piping shall be run as directly as possible and in the case of pumping systems, so laid that if practicable the pipes are pitched back toward the storage tank without traps.

g. Systems under pressure shall be designed for six times the working pressure and installation when complete shall be tested and proven tight at twice the maximum working pressure.

12. VALVES

a. Readily accessible valves shall be provided near each burner and also close to the auxiliary tank in the pipe line to burners.

b. Control valves shall be of approved type provided with stuffing box of liberal size, containing a removable cupped gland designed to compress the packing against the valve stem and arranged so as to facilitate removal. Valve shall be designed to close against the supply, and to prevent withdrawal of stem by continued operation of the handwheel. The use of packing affected by the oil or heat is prohibited.

13. EMERGENCY CONTROL

Means for remote control of the flow of oil to the burner should be provided for use in emergency, and a sign indicating its purpose shall be located at the control device.

Note: A switch in the motor supply circuit may serve this purpose for an electrically driven equipment, or a quick closing valve in the oil supply line, arranged to be operated from a safe location, preferably outside the building, may be used.

14. BURNERS

a. The size of the orifice through which the oil is supplied to the burner shall be limited to furnish only sufficient oil for maximum burning conditions when the controlling valves are wide open.

b. Valves shall be arranged so as not to enlarge the orifice.

c. Burners containing chambers which allow the dangerous accumulation of gases, or oil conveying pipes or parts subject to intense heat or stoppage due to carbonization are prohibited.

d. Burners shall be so designed as to permit of ready cleaning and not allow the leakage of oil.

15. PILOT LIGHT

Automatic systems shall be so designed that the flame cannot be extinguished by operation of the automatic control valve, or a gas pilot light shall be provided in the combustion chamber.

16. FURNACES OR RANGES

a. Previous to the installation of the burner, the ash door of the furnace shall be permanently removed, or bottom ventilation otherwise provided to prevent the accumulation of vapors within the ash pit unless burner is of type which mechanically purges ash pit. When ash door is closed it is recommended that other doors of furnace be arranged to swing from the top or be otherwise arranged to relieve pressure sometimes caused by puffs or backfire due to delayed ignition.

b. Stoves or ranges originally designed for use of fuel other than oil should not be used in connection with oil burners unless spaces in which vapors might collect are adequately vented.

c. Dampers which may entirely close the chimney uptake are prohibited. Damper area should be carefully determined in each case but in no case shall it be greater than 80 per cent. of the internal cross sectional area of the uptake.

d. No combustible material shall be stored within 10 feet of furnace door.

e. It is recommended that where automatic operation is provided by means of a room thermostat the installation should be equipped with an additional thermostatic control to prevent abnormal water temperature, abnormal steam pressure, or overheated hot air furnace ducts. Such automatic shut-off device should be so arranged that it must be reset manually.

17. FIRE PROTECTION

a. Any woodwork, wooden lath and plaster partition or other combustible material within 4 feet of the sides or back or 8 feet from the front of the furnace shall be covered with approved plaster board or other approved combustible material. Above the furnace there shall be constructed a ceiling consisting of plaster board covered with sheet metal, or cement plaster on metal lath; said ceiling shall extend 4 feet beyond the sides and back and 8 feet from the front.

At least a 36-inch clearance is necessary between top and sides of breeching and flues from ceilings, partitions and other combustible material, unless the breeching and flues are insulated with two to four inches of asbestic magnesia lagging or equivalent in which case the clearance may be reduced to 18 inches.

b. Near the furnace, and so located as to be convenient for use in emergency, there shall be provided a hand fire extinguisher of approved type suitable for use on oil fires.

18. INSTRUCTION CARD

A card giving complete instructions in regard to the care and operation of the system shall be permanently posted near the apparatus. Said card shall be placed under glass and framed.

19. INSTALLATION

Oil burning equipment shall be installed only by properly qualified mechanics experienced in this kind of work. It is recommended that systems be installed by the manufacturer.

ADDENDA SHEET

1926

Changes in

Regulations of the National Board of Fire Underwriters

for the Construction and Installation of

OIL BURNING EQUIPMENTS

and for the Storage and Use of

Oil Fuels in Connection Therewith

Recommended by the

National Fire Protection Association

EDITION 1925

Paragraph 9a 2, pages 7 and 8, amend to read:

"2. Horizontal Tanks over 1,100 gallons capacity:

"Tanks having a diameter of not over 6 feet shall be made of at least 3/16-inch steel.

"Tanks having a diameter of over 6 feet and less than 11½ feet shall be of at least ¼-inch steel."

Paragraphs 8a and b, page 23, amend to read:

"8. Gravity and Pressure Tanks:

"a. Gravity feed to burner from either auxiliary tank or 275 gallon storage tank may be permitted if suitable automatic safeguards to prevent abnormal discharge of oil at the burner are provided.

"b. Auxiliary pressure tanks having a capacity not to exceed 60 gallons may be permitted if safeguarded as specified in the preceding paragraph."

TESTING OIL BURNERS FOR SAFETY

and

THE PROPER INSTALLATION OF DOMESTIC OIL BURNERS

Reprint Through Courtesy of

UNDERWRITERS' LABORATORIES, CHICAGO, ILL.

Incorporated 1901

Established and Maintained by the

NATIONAL BOARD OF FIRE UNDERWRITERS

For Service—Not Profit

TESTING OIL BURNERS FOR SAFETY

Judging from the numerous inquiries that are received daily from the public and from insurance companies, as to which burners are listed and which are not, and why some burners are not listed, a greater interest is being taken in the subject than in the past.

Only a few days ago a prospective purchaser of an oil burning equipment came to us to find out for himself just what difference it would make to him whether he purchased a listed or an unlisted burner. One of his first questions was: "Now just what is the meaning of an 'approved burner'? You have about fifteen approved burners on your lists and I have been told there are fifteen hundred or more which are being made and which are not approved." This was by no means an unusual question. It has been asked before by other prospective users to whom the same question occurred. Some of them have written us for information on burners in which they were interested and others have come in to find out for themselves. Those who take the trouble to come in, are always shown what methods are used in determining whether or not favorable recommendation is to be made on the burner, but there are a great many people who, even though they are interested, are not able to come in and see these things for themselves. For these a brief description of methods may be of interest.

To those who may not already be acquainted with the fact, it should be said that first of all the study of oil burners is confined chiefly to the features of safety. The Laboratories do not attempt to find out how efficient a burner is. Primarily, the questions to be settled are: "Will this burner set fire to the building in which it is installed, or is there a possibility of its causing an explosion, or being instrumental in injuring the person giving it the ordinary amount of attention required?" While these questions are comparatively simple in themselves, to answer them satisfactorily involves going into a great many details of construction and performance.

Roughly speaking, there are three general parts to the work of a complete investigation of any oil burning equipment. These include a study of the design and construction from blue prints and the actual samples; tests of the samples and an investigation of the field service record. Sometimes preliminary work is confined to either the study of design and con-

struction or to tests of samples, as some burners do not have a field service record, not having been put into use for any length of time. In consideration of domestic oil burners, ordinarily only the burner itself is considered and the tankage and piping, all a part of the complete installation, is not a part of the listed burner.

For the sake of simplification, burners now found in use can be divided into three general classes, atmospheric draft burners, commonly called gravity burners; mechanical draft burners, usually of the automatic type; and industrial burners, intended primarily for large heating and power installations where a competent attendant is always at hand.

The atmospheric draft burners, although usually simple in construction, sometimes present difficulties not anticipated. Although there are a number of different constructions, and each is claimed to be superior to the others with respect to economy of combustion or other factors, the general principle of operation is much the same. The oil to be burned is fed into the combustion chamber in small quantities, where it is vaporized by the hot castings over which it flows, and in burning draws in the necessary air for combustion through air ducts leading to the ash pit. The air is usually brought into the combustion chamber near the point of vaporization of the oil. A good many manufacturers of this type of burner do not have service organizations of their own to make the installation when a burner is sold, but furnish instructions which go with each burner telling how it should be installed, operated, and maintained. Accordingly, the instructions furnished are important, as the safety of any oil burner system depends in a large measure upon the manner in which it is installed. As a part of the investigation the Laboratories sees to it that the instructions which are to be furnished with each burner are clear, concise, and recommend good practice. The illustration, Fig. 1, showing furnaces Nos. 1 to 4 was taken in the laboratory where burners of this type are tested. Installation is made in one of the test furnaces in accordance with the manufacturer's instructions.

As one of the important factors in the use of burners of this type is the selection of suitable grades of oil, at least part of the test work is done using the lowest grade of oil which the submittor claims is suitable. As a matter of record, samples of all the oil used during the tests of the equipment are tested for flash point and specific gravity and notes made as to the general appearance and quality of the oil. Some burners of this kind will operate very nicely when there is a good draft in the heating system and when a good-sized fire is kept, but may give trouble if the draft is poor, or if attempt is made to operate them at low flame, as might be desired in mild weather. Under this condition burners, if not properly designed and installed, or if supplied with unsuitable grades of oil, may carbonize excessively or go out frequently. Tests are made both under low and high flame conditions. A special arrangement has been installed as a part of the test equipment whereby different draft conditions can be obtained and it is regular practice to try the operation both with low and high drafts. For all burners of the domestic type, which are intended for operation without a competent attendant on hand at all times, it is a requirement that means be provided for automatically shutting off the supply of oil in case of flooding of the burners or extinguishment of the flame. This method commonly takes the form of a drain system from the combustion chamber to an overflow cup or float mechanism interconnected with a valve in the oil supply line, and as excessive carbonization may sometimes be sufficient to interfere with the intended operation of the safety device, it is, therefore, necessary to make a careful study of the equipment with regard to any tendency toward carbonization. Repeated tests are made with the anti-flooding devices to make certain that they will function as they should in case of flooding of the burner.

In the general study of the burner design, substantiality of construction, rigidity and security of the burner parts, and protection against injury or change of adjustment are all carefully considered. For some burners of this class it is very important that the burner castings in the furnace be properly located and secured with relation to other parts, and while we cannot always control the proper setting of them at each installation, we can see that they are made so that they can be properly set and secured without great difficulty. Another requirement which has to be met is that the safety features be arranged and protected so that accidental injury is not likely and so that in case the anti-flooding device operates to close off the oil, the receptacle for collecting it must be emptied and returned to its proper position before the apparatus can be reset and the burner put into regular operation again.

The mechanical draft type of burner with its automatic controls and other features, designed largely in some cases for the convenience of the owner, presents a great variety of interesting problems. As a majority of the manufacturers of this class of equipment make a practice of supervising their installations through a corps of service men connected with their dealer organizations, the installation for our test work is usually made by one of the regular installation men. Fig. 2, showing furnaces Nos. 5 to 9, gives a partial view of the laboratory used for testing burners of this class. For convenience in making installation and for the sake of appearance and protection, piping for conveying the oil and gas, and to enclose the electric wiring is permanently installed along the rear of the room and terminals brought up near the front of each furnace where connections are made.

Another illustration, Fig. 3, shows a series of automatic fuel pumps under investigation, which at the same time are being used in connection with the testing of those burners requiring the oil to be fed to them by gravity. This same illustration includes, near the left side, a view of an automatic switching device which is used in giving the burner intermittent operation tests without attendance. By means of this apparatus burners can be automatically started and stopped as they would be under some conditions of service when controlled by a room thermostat. This method gives repeated tests of the control and ignition systems and is especially important with burners of this class on which great dependence is placed for reliability of operation without attendance. Sometimes in addition to the regular intermittent operation tests of the complete equipment, we find it desirable to make special endurance tests on the separate control or ignition units. For this work it is usually the practice to build up special forms of apparatus which will give the device frequent repeated tests so that the results of a long time operation in service, as far as the action of the control is concerned, can be approximated in a comparatively short time.

As with the burners of the natural draft type, the lowest grade of oil recommended by the manufacturer is used when testing burners of the mechanical draft type. In addition, because of the automatic means of ignition employed, some of the tests are made with the oil at a temperature of about thirty-five degrees Fahrenheit. Burners operating unsatisfactorily under the cold oil test may sometimes accumulate a considerable amount of unburned vapors in the furnace, which, if later ignited, might result in an explosion of dangerous intensity. The safety features of the automatic burner for shutting off the power or oil supply or both in case of extinguishment of the flame or flooding of the burner are given very careful attention and repeated tests made under different conditions to determine their reliability of operation. Detailed examinations are made of the interior of the combustion chamber and burner parts to note any tendency toward carbonization which will result in trouble.

With burners using a gas pilot light for ignition of the oil vapors it is essential that some means of protection be afforded to prevent the flame from being blown out by back drafts or other means during stand-by periods when the pilot flame alone is burning. With certain other constructions it is essential that interior parts of the equipment be protected against excessive heat which might result in warping, cracking, or other failures. With equipment of this kind it is always desirable that suitable means of attachment or anchorage be furnished so that once the burner is properly installed it is not likely to be moved out of alignment or adjustment accidentally or when being given attention. As far as practicable these burners should be designed, constructed, and installed so that there will be little need for adjustment or replacement of parts. A great many burner manufacturers maintain adequate service systems and would prefer to have the owner put in a service call rather than attempt to make adjustments or repairs himself. It is highly desirable that as near as possible the automatic burner be designed and assembled as a unit which is adjusted, inspected, and tested at the factory in which it is made, leaving only the necessity of proper setting and connection of oil, gas, or electricity to be made at the installation. After the regular operation tests are finished the entire equipment is carefully examined to note compliance with the construction specifications, instances of excessive wear, warping, cracking, leakage, or any other failure to stand up under service conditions. The flash points and specific gravities of all oils used during tests are recorded with the record of the burner performance.

While the laboratories have certain standard tests, as have already been mentioned for burners of all classes, tests are not necessarily limited to only these, and watchfulness is always exercised for conditions which may not have manifested themselves before, or which may be special to any one make of burner. In certain cases special tests have to be devised to take care of these unusual situations.

It is always recommended, even where regular service systems are established, that the manufacturer of the burner provide a form of service manual for the guidance of the men in making installations and adjustments, and also that the owner of the equipment be furnished with adequate operating and maintenance directions.

As it is important that the burner parts arrive at their destinations without having been injured in shipment, the methods of packing burners for shipment are looked into, and, if necessary, recommendations made for improvement.

Every burner to be listed as Standard must bear an identifying marking by means of which persons interested can ascertain whether or not it is listed. This marking must be distinctive in that it may not be applied to similar equipments produced by the same manufacturer, which are not constructed in accordance with the Laboratories' requirements. Underwriters' Laboratories issues at frequent intervals up-to-date lists of those burners which have been tested and recommended for listing as Standard and in case of doubt reference can always be made to these lists. It often happens that the identification marking includes a type number or other designation, in addition to the trade name of the burner, which is necessary to distinguish listed burners from similar unlisted ones made by the same manufacturer.

Owners or others persons interested in these equipments should carefully note the special designation on the burner in determining whether or not it is listed.

It is very desirable, and the practice is followed wherever possible, to go out into the field and examine installations of the burner under consideration, so that as much field experience as is possible can be accumulated. It sometimes happens that a field investigation will show up

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

defects which might not otherwise be apparent and which can be corrected by slight changes in construction.

Burners of the industrial type are quite another problem, although some of the fundamental principles of safeguarding the domestic type can be applied. Burners of the industrial type are generally considered for installations where a competent attendant will be constantly on the premises to give them such attention as may be needed. In some cases this is voluntary on the part of the owner and in others it is required by state laws and local ordinances. In the past the regulations of the National Board of Fire Underwriters for oil burning equipments of the industrial class have specified that industrial installations shall be provided with duplicate pumps.

On account of the fact that there are many places in industrial service where what might be termed auxiliary burners are employed, and which do not involve need for continuous service, proposal has been made to require duplicate pumps only where fire protection equipment is dependent upon the use of fuel oil for heating, or steam, or where necessity for continuous operation of a plant makes it impracticable to shut down for repairs. This proposal, when finally ratified, will result in a classification as "Industrial Oil Burners," unit equipments provided with single pumps and of a type specified for use where there is an attendant constantly on the premises. An equipment of this sort is also used in large apartment houses and small hotels, as well as in some industrial applications.

On account of the wide variety of conditions which have to be met in the industrial installations, there is usually more variation than is the case with the domestic burners and often instead of having a one-unit burner, the equipment will comprise a number of separate units such as the burner head, pumps, oil heaters, governors, and other auxiliary apparatus. The two No. 12 Kewanee boilers, numbered 10 and 11 in Fig. 4, are used in testing the industrial burners, and it is the practice to make typical installations in these boilers and operate them over a period of time using different grades and qualities of oil. With burners of this class it is the general practice to provide ignition by means of a torch, doing away with the complications of automatic ignition commonly used with burners intended for intermittent operation. In consideration of these burners the equipment is studied in the light of the method of handling the oil, pressures under which it is used, general construction of pumps, valves, strainers, governors, and other apparatus and such interconnections as may be provided between the fuel and the air or steam atomizing agent. Rugged, substantial construction is desirable for the various parts of the system. Electrical equipment where used may be either listed equipment suitable for that class of work or such other special equipment as may comply with construction requirements.

Where the burner system, exclusive of tankage and piping, consists essentially of a number of units the means of identification includes, in addition to a master name plate, or marking, separate reproductions of the designated marking on each of the essential elements of the system so that users can distinguish the equipment when necessary. As in the case with burners of other classes, listing implies agreement on the part of the manufacturer to continue to construct the listed burners in accordance

with the arrangement accepted for listing, unless subsequent changes have been formally authorized by the Laboratories.

In general, the listing of any oil burning equipment by Underwriters' Laboratories means that the equipment has been examined and tested, and found to comply with the minimum requirements in effect for its class, and that the manufacturer has agreed to maintain the standard established and to identify the listed product with the marking agreed upon. Particular attention should be paid to the exact form of marking used to designate the listed device as stated on each card and in the regularly published list under the heading of "Marking." The listing of oil burners as Standard does not mean that the products listed are necessarily equivalent in quality or merit. Any question with regard to the effect of the installation of an oil burner on insurance rates should be taken up with the company insuring the property or with local authorities having jurisdiction.

THE PROPER INSTALLATION OF DOMESTIC OIL BURNERS

The fact that it is estimated that during the past winter, 200,000 homes were heated with oil and that this number will be increased to 250,000 for the coming winter, gives reason for serious consideration of proper methods of installation. The Regulations of the National Board of Fire Underwriters for the Installation of Oil Burning Equipments will serve as a guide to the user of liquid fuel, and with these regulations enforced by fire marshals and others invested with the necessary authority, we may expect no serious increase in the fire hazard.

A well designed burner, properly installed, properly maintained, and supplied with a proper quality of clean oil of the quality for which the burner has been found to be suitable, should give to the householder practically all that the most enthusiastic salesman is ready to predict. Do not ask me to tell you what is the best oil burner. Underwriters' Laboratories' engineers do not investigate oil burners for the purpose of determining the most efficient device; what they have in mind is to determine whether the device has been safeguarded to a reasonable degree and whether the burner is so made that it may readily be installed in accordance with the National Board Regulations. They go even further by insisting that the manufacturer shall furnish complete installation directions which must be made to conform to the National Board Rules.

After determining the burner to be used, or better still, while studying the merits of the various types of burners now on the market, the householder should determine whether his furnace and chimney are in proper condition. Chimneys that are too small, that are filled with soot and loose plaster, or in which the mortar has crumbled away from between the bricks, cannot be classed as a desirable adjunct to an oil burner. Naturally, they are to be condemned for use with any kind of fuel, but we must remember that, with the steady flow of heat that may be produced by the oil burner when used in the ordinary type of furnace, the temperatures within the chimney may be expected to be higher, in many cases, than where solid fuels are used. The flue to which the products of combustion from the oil burner are conducted should be used for no other purpose, and dampers which may entirely shut off the passage of fumes or gases up the flue should be removed entirely or so reduced in size that not more than 80 per cent., or even less, of the area of the flue may be cut off. The provision of stops or other means for preventing the complete closure of a damper should not be considered as being an adequate means for complying with this requirement. Where burners of the natural draft type are to be used, special care should be taken to see that the flue is sufficiently large and that the top of the chimney is well above surrounding objects which might interfere with the draft.

As most oil burners are installed in heating units designed to burn solid fuels, it is necessary to determine whether the shape of the combustion chamber is adapted to the particular type of burner selected. It is necessary to have the combustion chamber sufficiently large to give ample space for complete combustion. An oil burner flame impinging on a relatively cool surface will certainly result in trouble. Incomplete combustion means soot. Soot is conducive to chimney fires, and from chimney fires to the ignition of the roof is but a short step. The fact that chimney fires in the United States during 1922 caused a loss of over $18,500,000.00 proves that the above suggestion is distinctly in order. Any sign of soot within the furnace is evidence of improper combustion, and, aside from the use of a poorly designed burner, the installation of an oil burner in a furnace with insufficient combustion space or of a shape not adapted to the flame of the burner used, will certainly give poor results even though the house may be kept at a comfortable temperature.

Before installing an oil burner, any woodwork, wooden lath and plaster partition, or other combustible material within 4 ft. of the sides or back, or 8 ft. from the front of the furnace, should be covered with approved plaster board or other approved incombustible material. Above the furnace, the ceiling should be of cement plaster on metal lath or made of plaster board covered with metal. This protection should extend at least 4 ft. beyond the sides and back, and not less than 8 ft. beyond the front of the furnace. If the smoke pipe is in poor condition, it should be replaced, and in case the distance between it and the ceiling, partitions, or other combustible material is less than 36 in., the pipe should be insulated with a suitable non-combustible lagging. The owner also should install a hand fire extinguisher of a type suitable for use on oil fires, and it likewise would be well to place a box of dry sand near the furnace. Such protection should be installed even before the oil burner is put in so that in case of accident, the workmen may have this aid in controlling a fire.

The installation of the oil burning system involves the placing of tanks, piping, the burner proper, and, in some cases, electrical wiring. In handling all of these items, the installer should follow the National Board Rules and the National Electrical Code. Three types of tank installations are commonly employed. In one very common form of installation, a small tank, generally referred to as an auxiliary tank, is placed in the basement and mounted at a point above the burner in order to provide a gravity feed for the oil supply. Where the user desires to provide a larger supply of oil, either an inside storage tank or an outside underground storage tank is installed and connected with the auxiliary tank by two pipes, a suction pipe for a hand pump to lift the oil from the storage tank to the auxiliary tank and an overflow pipe of ample size to return any surplus oil to the main storage. The third type of tank installation consists only of an outside underground tank from which the oil is delivered to the burner by means of a power pump. Other methods are sometimes used, some of which while favorites in certain territories, possess elements which, in our opinion, more than offset any economies that may be offered as the reason for their use. The installation of the main storage tank at a point above the level of the burner and conveying the oil to the burner by gravity, may be convenient and certainly costs less to install but has little else to commend it. Other subnormal and abnormal forms of tank installations have been, and are being used, but since we are talking of proper installation, it is not necessary to cite further horrible examples.

In the first type of standard tank installation mentioned above, it is necessary to run the fill pipe and the vent pipe to the outside of the building so that the filling operation may be carried on without danger of spilling oil in the basement. To fully accomplish this purpose, the tank should be of substantial construction and should have no openings into the basement

through which vapors or oil, in the case of overfilling, may enter the basement. Gauges should be of such a type that the oil level may be determined without opening the tank and should not involve the use of glass, the breakage of which will allow the escape of vapors or oil into the basement. In the second type of tank installation, the same remarks may be made with regard to the construction and tightness of the auxiliary tank, but in addition to this, it is necessary to see that the pump in the supply line is of a substantial type, free from leaks, and not unduly subject to wear. Various pumps of approved type are available for this service. All pipe connections between the underground storage tank and the inside equipment must be continuous, and as is the case with all oil piping, the pipe joints must be made up with full clean threads and preferably made additionally secure against leakage by the use of litharge and glycerine or an equivalent. When installing tanks, whether they be outside, underground, or in the basement, they should be set on a firm foundation, and auxiliary supply tanks which must be elevated should be supported by a substantial non-combustible rack or platform firmly secured to the basement floor or walls in order to prevent the possibility of setting up strains in the piping. The tank should be firmly secured to its support and the support bolted to the floor. Underground storage tanks should be buried in clean earth, well tamped in place but if placed in pits, they should be completely surrounded with sand. Cinders should not be used in contact with the walls of the tank on account of corrosion. When speaking of corrosion, it is well to point out that while most reliable tank makers coat their tanks with a rust-resisting paint before shipping, the rough usage due to handling can be expected to injure the coating. It is well to repaint the tank before installing as this will add to its life. Before covering up an underground storage tank, be sure to give your local inspector an opportunity to examine the setting to determine whether the piping where it passes through the wall has been properly cemented and the whole installation complies with local or state regulations.

When installing oil burner piping, be sure to have the pipe of ample size, properly cleaned and inspected. Small pipe may cost a little less and is easier to install but the larger pipe is not so easily broken, and in case foreign material gets into it, there is less chance for clogging at points that are difficult to locate. Although screens are generally placed in the fill pipes of tanks, the oil men may be expected to remove them to hasten the flow of oil. A strainer of ample screen capacity should be installed in the pipe line where it is readily accessible for cleaning and where it will prevent the transmission of dirt to pumps, valves, or any constricted passageway. Piping should be laid in corners or otherwise so placed that it will not be subject to shocks. Where it cannot be laid in corners, it is preferable to provide a trench or runway in the floor. Some installations have been made by burying the pipe in concrete, but objection has been made to this on account of the difficulty in cleaning the pipe should it accidentally become filled with water or dirt. When the piping cannot be pitched to drain to an underground tank, it is well to pitch it to one point in the system where an enlarged or extended section of piping may be located for the purpose of collecting water and other heavier-than-oil matter that may get into the piping. Such a trap should be provided with a plugged opening for draining, so located that a receptacle may be placed under it to receive the drip when the plug is taken out. Where pipe joints must be made with other than standard threaded couplings, approved unions of the metal-to-metal seat type should be used. Gasketed unions are likely to be fitted with inferior or improper gaskets, and in the general run may be expected to be a frequent source of leaks. After the piping installation is completed, it should be tested, and if any leaks are found, they should be repaired at once. Unfortunately, leaks in oil piping will not close up as is the case with small leaks in water piping, and to say

the least, an oil burner equipment with small pools or spots of oil under numerous joints is most unsightly. The principal object to have in mind when installing tanks and piping for an oil burning installation, is to make assurance doubly sure that the oil is all delivered to the burner. Even though fire prevention is lost sight of, good housekeeping and economy should be a guide that will bear its own reward.

The proper installation of the burner itself is one which may be left to a competent installer working under the supervision of the burner manufacturer or his agent. The practice of the building owner making his own installation, although sometimes necessary, is not to be encouraged, even though the manufacturer has supplied more or less comprehensive installation directions with the equipment. Special situations arise in which the householder will be at a loss as to how to proceed; the manufacturer's installer being trained for the work will know the answer and be able to surmount the difficulty.

While it is true that it would be difficult to give detailed directions to fit all burners, some general precautions may well be cited. Burners should be firmly fixed in place so that accidental jarring may not strain the piping or throw any parts out of adjustment. Some types of burners are required to be set level in order to obtain proper results; others must be pitched in one direction or another. The general reason for this is to drain the oil, in case of abnormal discharge, to a point where it will be collected and serve to operate an anti-flooding device. If the anti-flooding device does not operate, any condition that results in the extinguishment of the burner flame or its failure to ignite will permit the continued discharge of oil at the burner, ultimately flooding the ash pit, and if not discovered, may transfer the entire oil supply from the tank to the basement floor. Firemen from many cities have reported that the failure of anti-flooding devices is probably the most frequent source of fires in connection with oil burners. Most of the fires that have been investigated indicated that the principal cause of the failure of the anti-flooding device has been due to the faulty design of the device. Other causes have been the clogging of the drain pipe by soot accumulations, scale from the inside of the combustion chamber, and in one case, it was reported that the housemaid had disposed of waste paper and rubbish by burning it in the furnace on top of the oil burner. These latter causes, of course, are aside from any question of installation, but will serve to indicate that the anti-flooding device must be given proper care and attention, not only at the time of making the installation, but periodically throughout the life of the burner. The installer of the burner should test the anti-flooding device by operating the burner without igniting the oil, thus determining whether the burner is properly set and that all of the connections are oil tight and properly drain to the point where the control is located. Where the manufacturer does not maintain a service system, the owner should ascertain, at least every fall before putting the burner into operation, that the anti-flooding device is in good order and that the drain pipes are not clogged.

The manufacturer of every burner listed by Underwriters' Laboratories is required to furnish a card of operating directions in a form suitable for posting near the furnace. The National Board Regulations recommend that these directions be framed and covered with glass. Without this protection, these directions may soon be lost and the proper handling of the burner will depend upon the recollection of whoever may happen to take charge of the device. Local authorities should insist upon the proper posting and preserving of the operating and maintenance directions, as well as their observance. I find that, in some cities, the fire departments make a practice of investigating all new burner installations. This is a practice that might well be followed in all cities. Copies of the National Board Regulations for the installation of oil burners may be obtained by addressing the National Board of Fire Underwriters, 76 William Street, New

York, and it would be a most excellent practice to furnish each inspector with a copy of the rules as a guide in checking up original installations. This familiarity with each individual installation may be of great value at the time of a fire.

As previously intimated, something more than assurance of the original proper installation of the oil burner is necessary. The householder must be brought to realize that any heating device, be the fuel a liquid or a solid, should be given proper attention. Perhaps, the National Fire Protection Association, in its Monthly News Letter to its members, could send out a general warning each fall to spread the gospel of putting furnaces and chimneys in order in anticipation of the coming demand for heating service. General warning with regard to proper care of oil burners could be included in such a bulletin. State fire marshals could likewise send out proper seasonal warnings through the press, and thus reach at least the reading public.

Active interest in fire prevention has really existed but little more than a third of a century, and as might be expected, much remains to be done. Progress is being made year by year, but so much remains to be done that there is no excuse for flagging interest. The oil burner is but one of the problems requiring attention, but let us give this one subject careful thought to the end, that not only may the burner itself be improved, but its installation and maintenance be given such an intelligent degree of care by the user and manufacturer that the increase in the number of installations may be no cause for alarm. Underwriters' Laboratories will welcome suggestions as to improvements in construction or installation requirements. A letter addressed to 207 E. Ohio Street, is always welcome and our lists of inspected devices are available for the asking. In the case of oil burners, the demand for information has been so pressing that we have for some months past been revising the list monthly. This list is not a large one, but it shall be our endeavor that as it increases in size, the quality of the products listed will correspondingly increase.

Hollow Metal Doors Frames Elevator Enclosures
Steel Partitions Bank Counters
Bilt-to-order Steel Furniture Architectural Bronze

A. E. OHNSTRAND
Bulletin Building
Philadelphia Pennsylvania
Rittenhouse 8127 Race 2276

Specifications

for

FUEL AND ILLUMINATING GAS PIPING AND FIXTURES

In effect July 1, 1912. Superseding 1909 Edition

CHAPTER 1

Definitions

1. PIPING

The term "piping" as here used is intended to designate any system of piping which obtains or is intended to obtain its supply of gas through one riser, or from one source. Where two or more tenants occupy one building, and each has a separate system of piping, fed by a separate riser, each system of piping is considered distinct in itself, as though it had been in a separate building.

2. NEW PIPING

The term "new piping" designates only that piping that is installed by the applicant as a part or all of the present job, that is, the job which leads to the application for the inspection in this particular case.

3. OLD PIPING

The term "old piping" designates all piping found on the premises when the applicant undertakes the present job. Old piping may or may not have gas in it; or it may or may not have been previously inspected.

4. NEW FIXTURES

The term "new fixtures" designates fixtures that have never had gas through them.

5. OLD FIXTURES

The term "old fixtures" designates fixtures that have had gas in them before.

CHAPTER 2

New Piping

6. PRESSURE TEST

The piping should stand a pressure of 3 lbs. per square inch, or 6 inches of mercury column, without showing any drop in the mercury column of the gauge, for a period of at least 10 minutes. Leaky fittings or pipe should be removed; cold-caulked or cement-patched material will be rejected.

7. PIPE SIZES AND LENGTHS

The sizes of pipes should not be smaller, or the lengths greater, than are called for in the schedule, paragraph 15.

8. OBSTRUCTIONS AND JOINTING

The piping should be free from obstructions. Every piece of pipe should be stood on end and thoroughly hammered, and also blown through, before being connected. White lead or other jointing material should be used sparingly, to avoid clogging the pipe. Jointing material should always be put on the male thread on end of pipe, *and not in the fitting.* The use of gas fitters' cement on joints is prohibited after being connected, all piping should be blown through from the last outlet on each floor to the lower end of the riser to make sure it is clear. No piping should be coated or painted until inspected and passed by the Company. The use of unions in concealed work, is not permitted; long screws, or right-and-left couplings should be used.

9. SLOPE OF PIPING

The piping should slope towards the meter, or towards an outlet from which condensation can be removed if necessary; or it may be laid level. Piping with a perceptible sag, which might hold condensation, will be rejected. It is especially important that underground piping be laid in such a way that condensation may be readily removed.

10. SUPPORT OF PIPING

(a) In buildings constructed with wooden floor joists and wooden frame-work in partitions, the piping should be rigidly supported by hooks, or straps, which are nailed or screwed to woodwork, or in the case of masonry walls, to wooden plugs inserted in these walls. Where either horizontal or vertical piping is not located sufficiently close to the woodwork to admit of secure fastening, additional wooden strips, spaced not more than 4 feet apart, should be provided. These strips should be supported at their ends on, and nailed or screwed to, wooden cleats which in turn are nailed or screwed to the joists or studding.

(b) In buildings where iron beams, concrete or tiling enter into the construction of floors and partitions, the piping, whether concealed or exposed, should be supported in a manner that is acceptable to the Company.

(c) The fittings that are back of all outlets, whether ceiling outlets or side wall outlets, should be firmly and rigidly attached by flanges, hooks or straps to the frame-work of the building. If there is no adequate support located back of the point where the outlet is desired, a strip, supported as described above, or some other means of support that is satisfactory to the Company should be provided.

11. RISER

(a) Where there is only one riser in a building, it should extend to a point within 24 inches (measured in a horizontal direction) of a vertical line from the head of the service.

(b) Where a building is to be occupied by more than one tenant the Company will set as many meters as there are separate consumers, but each meter should be located within sight of the end of the service; therefore, for every separate meter desired, a riser should be provided. These risers may drop to the basement at whatever points in the building are

most convenient, a clear space of not less than 3 inches, however, being maintained between any two of these vertical pipes. Risers which drop at points in the building, that are not in the proximity of the proposed location of the meters, should be extended horizontally. As the distance from the service at which these risers should terminate, will vary with different buildings, no distance is given here, but the fitter should in each case apply for this information at the office of the District Superintendent. (For convenience these offices will be referred to hereafter as "District Shops.")

(c) A riser should never come down an exposed wall if there is an inside partition wall that may be used; if there is no partition wall available, the riser should come down near a chimney breast of the exposed wall. A riser should not extend more than 3 nor less than 2 inches below the bottom of the joists. If the riser must be extended horizontally, in order to terminate as above specified, a tee, with plug looking down, should be put on the bottom of the vertical pipe. The riser should not end in such a place that beams, girders, heater pipes, etc., to be put up subsequently, would prevent making connections to the meter. In case it is necessary to locate the riser on a masonry wall, any offset in it due to the excess thickness of foundation wall over house wall, should be made by using 45 degree elbows placed so as to bring the riser clear of the edge of the foundation wall; the dropping of a riser down to the ledge of the foundation wall, and the use of a 90 degree elbow to come out, is not permitted.

(d) If the service has not been installed at the time the plan of the piping is made, the fitter should apply to the District Shop and obtain the location of the proposed service, as without this information a proper plan cannot be made.

12. PROTECTION OF PIPING

(a) When necessary to imbed a pipe in direct contact with neat cement or ordinary concrete, black iron pipe may be used. If cinders, salt, sea water, or other substance which has a corrosive action on the piping is to be used in the fabrication of the cement or concrete, or if the concrete or cement in which the pipe is laid is to be exposed to brine, acid pickling-bath liquor, or other liquids of corrosive nature, or if the pipe is to be in contact with composition flooring, or similar structural material, the piping shall be made up of pipe and fittings galvanized on the outside, and shall be painted with two coats of a pure red-leaded paint, a bituminous paint, or an equivalent protective coating. It is preferable that it also be wrapped or coated with an approved material for protection against corrosion.

(b) In buildings where the floors are so constructed that piping placed under them would be difficult and expensive to uncover, such as tile, mosaic, parquetry, double or diagonal flooring, etc., the piping should not be so placed, if it can be avoided; in some cases the piping may be left exposed below the ceiling; in case the beams, girders or joists are to be left exposed, the piping may be placed in an angle and concealed by a moulding; in case the piping *must* be concealed in the floor, do not locate it at the bottom of beams or joists which are lathed and plastered to form the ceiling, but place it above the supporting beams just under the floor covering, in grooves formed in the material on which the floor covering is laid, or, in case of cement floors, embedded in the cement. In some cases, the beams may be notched, or iron beams drilled through their webs, near their points of support.

(c) Vertical pipes, if they must be concealed, should, as far as possible, be located in hollow partitions, in preference to being placed in the studding or lathing back of the plaster on masonry walls.

(d) Where pipes pass through masonry walls they must be encased, the gas pipe resting on the bottom of the casing pipe, with a clearance of at least ½ inch on top.

(e) In view of the importance of the accessibility of the piping for purposes of cleaning and repair, the Company reserves the right to reject piping which has been placed so that it will be difficult and expensive to reach it, provided there is a more accessible location available.

13. OUTLETS

Ceiling outlets should project not more than 2 inches, nor less than ⅝ inch, and should be firmly secured and perfectly plumb. Side wall outlets should project not more than ⅞ inch, nor less than ⅝ inch, and should be at right angles to the wall and firmly secured.

14. GAS ENGINE CONNECTION

(a) The gas piping should be of sizes in accordance with the following schedule:

Size of Engine	Size of Connection
1 to 5 H.P.	1 inch
6 " 10 "	1¼ "
11 " 20 "	1½ "
21 " 30 "	2 "
31 " 40 "	2½ "

These sizes apply only where the length of piping from meter to engine is 50 feet or less, and where the piping supplies the gas engine alone. If other fuel or illuminating appliances are to be supplied from the same

DOMENICK LIBERI & SONS
STRUCTURAL STEEL ORNAMENTAL IRON
BUILDERS' IRON WORK
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PHILADELPHIA, PA.
BELL, OREGON 8062 KEYSTONE, RACE 2618

BUTLER & ORLANDO, GENERAL CONTRACTORS
5747-49-51 VINE STREET, WEST PHILADELPHIA
STONE MASONRY STONE QUARRIES STEAM SHOVELS
Excavation, Grading, Concrete Work, Sewers
Office Phone, Sherwood 3662

piping, the sizes given above should not be used. In case either of these conditions exist, the person estimating on, or installing the piping, should first communicate with the District Shop, and the proper size of piping will be furnished.

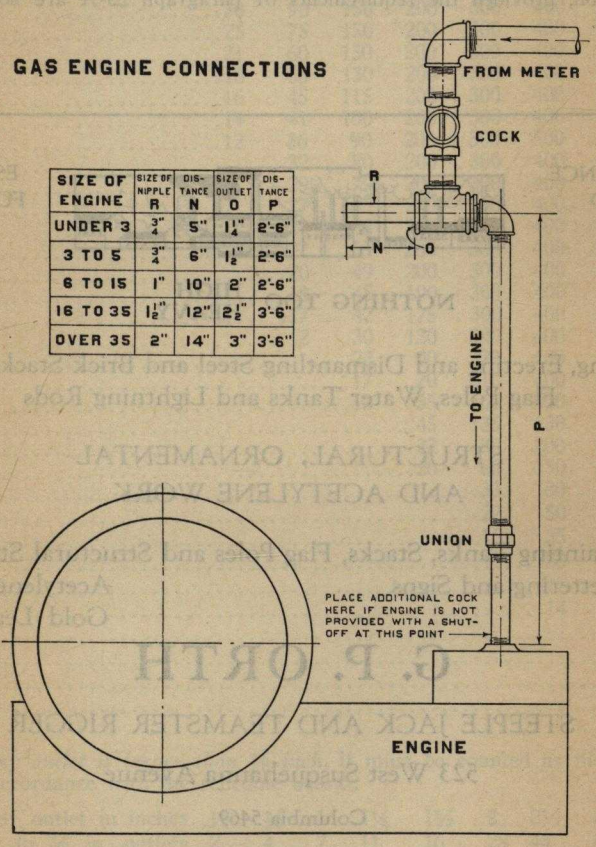
(b) When installing the gas piping for a gas engine of 5 horsepower, or smaller, the gas bag, which is ordinarily furnished with the engine, should be connected. If the engine is larger than 5 horsepower, the bag should not be connected, but in its place, a line run as per sketch below and the consumer advised to purchase from the Company, an antifluctuator, the cost of which about equals the credit the engine manufacturer allows on return of the bag.

After the piping has passed the inspection, the Company will connect to the tee, the anti-fluctuator, which takes the place of the gas bag.

(c) The piping should be connected to the engine, but not to the gas meter. It should terminate at a point within two feet of the outlet of the gas meter. As soon as the piping is installed, the person installing it should apply to the District Shop for an inspection of the piping.

GAS ENGINE CONNECTIONS

SIZE OF ENGINE	SIZE OF NIPPLE R	DISTANCE N	SIZE OF OUTLET O	DISTANCE P
UNDER 3	3/4"	5"	1 1/4"	2'-6"
3 TO 5	3/4"	6"	1 1/2"	2'-6"
6 TO 15	1"	10"	2"	2'-6"
16 TO 35	1 1/2"	12"	2 1/2"	3'-6"
OVER 35	2"	14"	3"	3'-6"



14-A. FUEL APPLIANCE CONNECTIONS OF EXPOSED PIPING

When the piping supplying a fuel (not lighting) appliance only is entirely exposed to view, the Company modifies its general rule regarding the inspection of piping, to the extent that the person applying for the inspection need not submit a sketch of the piping, and the Company will not make a pressure test with pump and gauge. The inspection will consist of a verification of the correctness of the size of the piping, and a visual inspection of the quality of the work.

14-B. CONNECTING PIPING TO METER

For any premises (apartment or complete house) not using gas at the time, the Company will connect the meter to one system of piping only, free of charge. The requirements for connection of new with old systems, or of two or more new systems, are given in paragraphs 25 and 25-A.

For any premises using gas at the time, the Company will connect to the meter, free of charge, any system or systems of piping that require inspection, provided the requirements of paragraph 25-A are not thereby violated.

INSURANCE AND

ESTIMATES FURNISHED

NOTHING TOO HIGH HEAVY

Repairing, Erecting and Dismantling Steel and Brick Stacks, Towers Flag Poles, Water Tanks and Lightning Rods

STRUCTURAL, ORNAMENTAL AND ACETYLENE WORK

Painting Tanks, Stacks, Flag Poles and Structural Steel
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G. P. ORTH

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523 West Susquehanna Avenue

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15. PIPING SCHEDULE

Required Sizes of Piping for Various Lengths and Numbers of Outlets

No. of ⅜ in. Outlets	⅜	½	¾	1	1¼	1½	2	2½	3	4
	LENGTH OF PIPE IN FEET									
1	20	30	50	70	100	150	200	300	400	600
2	27		50	70	100	150	200	300	400	600
3	12		50	70	100	150	200	300	400	600
4			50	70	100	150	200	300	400	600
5			33	70	100	150	200	300	400	600
6			24	70	100	150	200	300	400	600
7			18	70	100	150	200	300	400	600
8			13	50	100	150	200	300	400	600
9				44	100	150	200	300	400	600
10				35	100	150	200	300	400	600
11				30	90	150	200	300	400	600
12				25	75	150	200	300	400	600
13				21	60	150	200	300	400	600
14				18	53	130	200	300	400	600
15				16	45	115	200	300	400	600
16				14	41	100	200	300	400	600
17				12	36	90	200	300	500	600
18					32	80	200	300	400	600
19					29	73	200	300	400	600
20					27	65	200	300	400	600
21					24	58	200	300	400	600
22					22	53	200	300	400	600
23					20	49	200	300	400	600
24					18	45	190	300	400	600
25					17	42	175	300	400	600
30					12	30	120	300	400	600
35						22	90	270	400	600
40						17	70	210	400	600
45						13	55	165	400	600
50							45	135	330	600
65							27	80	200	600
75							20	60	150	600
100								33	80	360
125								22	50	230
150								15	35	160
175									28	120
200									21	90
250									14	59
300										39
350										29
400										22
500										14

If any outlet is larger than ⅜ inch, it must be counted as more than one, in accordance with the schedule below:

Size of outlet in inches	½	¾	1	1¼	1½	2	2½	3	4
Value in ⅜ in. outlets	2	4	7	11	16	28	44	64	112

16. EXPLANATION OF PIPING SCHEDULE

(a) This schedule is based on the standard formula for the flow of gas through pipes. The friction, and, therefore, the pressure necessary to overcome the friction, increases with the quantity of gas flowing through and as the aim of the table is to have the loss in pressure not to exceed one-tenth of an inch water pressure, per 30 feet of length of piping, the size of the pipe increases from an extremity towards the meter, as each section has an increasing number of outlets to supply. The quantity of gas the piping may be called on to deliver is stated in terms of ⅜ inch outlets, instead of cubic feet, outlets being used as a unit instead of burners, because at the time of First Inspection the number of burners may not be definitely determined. The consumption of gas through an outlet is assumed to be 10 cubic feet per hour, this being rather less than would be used by two ordinary burners.

(b) When, in following the requirements of the schedule, 2 inch pipe or larger is required, and objectionable cutting of joists will be necessary, if the fitter believes the quantity of gas to be consumed is less than that contemplated in the table, application may be made, *before beginning work*, to the proper District Shop for a modification of piping sizes.

17. USE OF PIPING SCHEDULE

In using the schedule, observe the following rules:

(a) No piping between the meter and the first branch line should be smaller than ¾ inch.

(b) No piping should be smaller than ⅜ inch.

(c) No independent line in the cellar or on the first floor, from the meter to a gas range or tank water heater or both should be smaller than ¾ inch for runs not exceeding 50 feet, if over 50 feet consult proper District Shop before starting work. When the range is supplied from the house piping, a ¾ inch outlet will suffice. Above the first floor, an independent line from the meter to a gas range on an upper floor should not be smaller than ¾ inch. No pipe laid underground should be smaller than 1¼ inch. No pipe extending outside of the main wall of a building should be smaller than ¾ inch.

(d) No ceiling outlet where the height of ceiling is 20 feet or more should be smaller than ¾ inch.

(e) Piping for any type of room heater, except gas logs, over 18 inches in length, and where line does not exceed 9 feet in length, should not be less than ½ inch. For similar installations with line exceeding 9 feet, the size should not be less than ¾ inch, but a short riser through the floor may be ½ inch. In other cases, and where the house piping is to supply fuel appliances, other than ranges, application should be made to the District Shop to ascertain the proper size of piping. In any case the capped outlet should not be more than 2 inches nor less than ⅝ inch above the floor level.

(f) In determining the sizes of piping, always start at the extremities of the system and work toward the meter.

(g) The lengths of piping to be used in each case are the lengths measured from one branch or point of junction to another, disregarding elbows or turns. Such lengths will be hereafter spoken of as "sections" and are ordinarily of one size of pipe. There are only two reasons for which a change in size of piping will be allowed in a section. First: Where the length of a section is greater than the length allowed for the outlets being supplied, as for example, if a section supplying two outlets is 33 feet long, 27 feet of this could be ½ inch, and the remaining 6 feet of ¾ inch. Second: Where the required length for the outlets being supplied will cause a violation of clause (j) unless the size is changed.

(h) If the exact number of outlets under consideration cannot be found in the schedule, take the next larger number. For example, if 27 outlets are required, the next larger number in the schedule, which is 30, should be taken.

(i) For any given number of outlets, do not use a smaller size pipe than the smallest size in the schedule for that number of outlets. Thus, to supply 17 outlets, no smaller size pipe than 1 inch may be used, no matter how short the section may be.

(j) In any piping plan in any continuous run from an extremity to the meter, there should not be used a longer length of any size pipe than shown for that size in the line opposite 1 outlet, as 50 feet for ¾ inch, 70 feet for 1 inch, etc. Exceptions to this rule are, First: When larger piping than called for by the schedule is run in following (k) of this paragraph. Second: When fitter voluntarily runs a larger size than is necessary, as for example, if three outlets are to be supplied by 60 feet of piping, instead of 50 feet of ¾ inch and 10 feet of ½ inch being required, the entire 60 feet may be of ¾ inch piping. When two or more successive sections work out to the same size of piping and their total length or sum exceeds the longest length shown for that size piping, the change in size to a larger pipe should be made as soon as the limiting length has been reached. For example, if 5 outlets are to be supplied through 30 feet of piping, and then these 5 and 1 more, making 6 in all through 24 feet of piping, it would be found by the schedule that 5 outlets through 30 feet require ¾ inch piping, and that 6 outlets through 24 feet require ¾ inch piping, but as the sum of the two sections, 30 plus 24 equals 54 feet, is 4 feet longer than the amount of ¾ inch piping that may be used in any continuous run, the 24 foot section must be changed from ¾ inch to 1 inch, 4 feet from the end nearest the meter.

(k) Never supply gas from a smaller size pipe to a larger one. If 25 outlets are to be supplied through 300 feet of piping and these 25 and 5 more, making 30 in all, through 100 feet of piping, it would be found by the schedule that 25 outlets through 300 feet require 2½ inch pipe, and 30 outlets through 100 feet require 2 inch pipe, but as under this condition, a 2 inch pipe would be supplying a 2½ inch, the 100 foot section should be made 2½ inches. This does not apply to the case of a small pipe inside of a building supplying one outside of a building, which has been made large as per (c) of this paragraph, because it is exposed to out-door temperatures.

18. PLAN OF PIPING

In preparing a plan, the following instructions should be strictly adhered to:

(a) Vertical piping should be shown parallel to the short side of the sheet.

(b) Piping through the length of the building should be shown parallel to the long side of the sheet.

(c) Piping across the width of the building should be shown diagonally on the sheet.

(d) State length and size of each section of piping. A section designates the length of piping existing between outlets, fittings and points of changes in piping sizes.

(e) On horizontal piping, mark the length under the line, and the size over the line.

(f) On vertical piping, including drops, mark the length to the right of the line, and the size to the left of the line.

(g) Mark each outlet X, and in the case of a plugged outlet, state its size.

(h) Plan should be folded on dotted lines.

19. EXPLANATION OF AN ASSUMED PIPING PLAN

(See Page 308)

Beginning at the point 1, which is farthest from the meter, piping 1 A, being 4 feet 6 inches long, and supplying the (one) outlet 1, should be ⅜ inch. Piping 2 A, being 1 foot long and supplying the (one) outlet 2, should also be ⅜ inch. Piping A B, being 12 feet long, and supplying the (two) outlets 1 and 2, should be ½ inch.

Piping 3 D, supplying the (one) outlet 3, and being 24 feet long, exceeds the maximum length of ⅜ inch permitted to supply one outlet, and, therefore, the distance 3 C should be composed of 20 feet of ⅜ inch, and the remaining distance C D, should be composed of 4 feet of ½ inch. Piping 4 D, being 8 feet long, and supplying the (one) outlet 4, should be ⅜ inch. Piping D B, being 1 foot long, and supplying the (two) outlets 3 and 4, should be ½ inch.

Piping B E, being 25 feet long, and supplying the (four) outlets, 1 to 4 inclusive, should be ¾ inch.

Piping 5 E, being 7 feet long, and supplying the (one) outlet 5, should be ⅜ inch.

Piping E G, being 30 feet long, and supplying the (five) outlets, 1 to 5 inclusive, cannot be composed entirely of ¾ inch, as only 50 feet of ¾ inch is permitted in a continuous run from the meter, and as 25 feet has already been used in the section B E, therefore the distance E F, should be composed of 25 feet of ¾ inch, and the remaining distance F G, should be composed of 5 feet of 1 inch.

Piping 6 G, being similar to 5 E, should be ⅜ inch.

Piping G H, being 1 foot long, and supplying the (six) outlets, 1 to 6 inclusive, should be 1 inch, because, even though ¾ inch, according to the schedule, is permitted to supply 6 outlets, the maximum amount of ¾ inch permitted has already been used in the distance B F.

Piping 7 J, being 15 feet long, and supplying the (one) outlet 7, should be ⅜ inch. Piping 8 J, being 3 feet 6 inches long, and supplying the (one) outlet 8, should be ⅜ inch. Piping J K, being 3 feet long, and supplying the (two) outlets 7 and 8, should be ½ inch. Piping 9 K, being 4 feet 6 inches long, and supplying the (one) outlet 9, should be ⅜ inch. Piping K H, being 25 feet long, and supplying the (three) outlets 7 to 9 inclusive, exceeds the maximum length of ½ inch permitted to supply three outlets, and, therefore, the distance K L, should be composed of 12 feet of ½ inch, and the remaining distance L H, should be composed of 13 feet of ¾ inch.

Piping H N, being 19 feet long, and supplying the (nine) outlets, 1 to 9 inclusive, should be 1 inch.

Piping 10 M, being 12 feet 6 inches long, and supplying the (one) outlet 10, should be ⅜ inch. Piping 11 M, being 7 feet 6 inches long, and supplying the (one) outlet 11, should be ⅜ inch. Piping M N, being 7 feet long, and supplying the (two) outlets 10 and 11, should be ½ inch.

Piping N O, being 1 foot 6 inches long, and supplying the (eleven) outlets, 1 to 11, inclusive, should be 1 inch.

Piping 12 O, being 9 feet long, and supplying the (one) outlet 12, should be ⅜ inch.

Piping O Q, being 3 feet 6 inches long, and supplying the (twelve) outlets 1 to 12 inclusive, should be 1 inch.

Piping 13 Q, being 23 feet 6 inches long, and supplying the (one) outlet 13, exceeds the maximum length of ⅜ inch permitted to supply one outlet, and, therefore, the distance 13 P should be composed of 20 feet of ⅜ inch, and the remaining distance P Q, should be composed of 3 feet 6 inches of ½ inch.

Piping Q R, being 5 feet long, and supplying the (thirteen) outlets 1 to 13 inclusive, should be 1 inch.

Piping 14 R, being 4 feet 6 inches long, and supplying the (one) outlet 14, should be ⅜ inch.

Piping R S, being 3 feet long, and supplying the (fourteen) outlets 1 to 14 inclusive, should be 1 inch.

Piping 15 S, being 1 foot long, and supplying the (one) outlet 15, should be ⅜ inch.

Piping S U, being 18 feet long, and supplying the (fifteen) outlets 1 to 15 inclusive, exceeds the maximum length of 1 inch permitted to supply 15 outlets, and, therefore, the distance S T, should be composed of 16 feet of 1 inch, and the remaining distance T U, should be composed of 2 feet of 1¼ inch.

Piping 16 U, being 5 feet long, and supplying the (one) outlet 16, should be ⅜ inch.

Piping U V, being 15 feet long, and supplying the (sixteen) outlets 1 to 16 inclusive, and also the plugged 1 inch outlet 17, which counts as 7 outlets, making a total of 23 outlets, should be 1¼ inch.

RADIATOR FURNITURE

CONCEALMENTS SHIELDS

W. H. SYLVESTER & SON

1807 North Howard Street Philadelphia

Telephone: GARFIELD 0611 *Write for Descriptive Folder*

SAMPLE PIPING PLAN
(SEE PARAGRAPH 19)
FOR THE PURPOSE OF EXPLANATION, THE SIZES OF PIPE SHOWN ON THIS PLAN ARE DESIGNATED AS FOLLOWS:
¾ INCH —— 1 INCH —— 1¼ INCH —— 1½ INCH —·—
THE GAS FITTER SHOULD, HOWEVER, USE ONLY SOLID LINES IN MAKING PLANS.
RISER FROM METER

20. REASON FOR INSPECTIONS

New piping should conform to the specifications in paragraphs 6 to 18 inclusive.

To insure the faithful observance of these specifications, the Company has established the following system of inspection.

21. FIRST INSPECTION

The First Inspection is principally *one of sight*, and, therefore, it is all important when the inspection is applied for, to have the piping *in view*. It consists of an examination by the Company's Inspector of the system of piping, after the installation has been completed, and before it has been enclosed out of sight; and also a test of the piping unless excepted by (paragraph 14A 2-15-22) while it is exposed, under a pressure of 3 pounds per square inch, or 6 inches of mercury column. The column must show no drop for a period of 10 minutes. To obtain this inspection the fitter must:

(a) Screw caps on every outlet, so that the Inspector can make the pressure test. Omission of caps or use of cement to plug piping (either at the bottom of the riser or at any outlet), will be sufficient cause for the inspector to refuse to pass the inspection.

(b) Test the piping with his own pump and gauge before requesting inspection.

(c) Send request for inspection to District Shop.

(d) Accompany said request with a plan of the piping, prepared as described in paragraphs 19 and 20. For exception to this rule, see (d) paragraph 14. Sheets of standard size for these drawings are furnished by the Company, free of charge, and should be obtained at the District Shop. The Company reserves the right to reject plans not made out on these sheets. One plan will be accepted for an entire operation providing the piping in each house is the same, and all the work is completed in a reasonable time. If part of the work is greatly delayed, another plan may be required.

(e) When the piping is to remain permanently exposed, and it is to be used for fuel purposes only, First Inspection only will be required. If piping is exposed and is to be used for illuminating purposes only, or for fuel and illuminating purposes, and the applicant who installed the piping, is also to install the fixtures, the First, Second and Third inspections may be combined in one inspection.

(f) The First Inspection *may be omitted* if the building, or portion of the building that is being piped *is occupied*. This omission is made in order to avoid undue inconvenience to the occupant; but where the fitter can arrange to leave all the piping exposed for a long enough period to permit of the First Inspection, and at the same time not unduly inconvenience the occupant, he should do so. Buildings that are furnished but not occupied will not be accepted as occupied.

(g) Caps should be allowed to remain on outlets until the fixtures are hung. The caps are necessary in order to protect the threads of outlets, and to prevent obstructions from entering the piping. Builders should insist on this practice being followed by fitters.

(h) When a gas log or any kind of fire place heater is to be installed, the supply line should be run to the point where the cock will be placed, before requesting First Inspection.

22. FIRST INSPECTION CERTIFICATE

a. If the First Inspection certificate is granted, the piping may be enclosed. After all danger of injury to the piping by the building construction is passed, the fitter should apply for the Second Inspection.

b. If the First Inspection certificate is refused, the cause of the refusal will be explained to the applicant, who is required to remedy the defects while the piping is still visible.

c. If the piping is approved, the following certificate is given:

FIRST INSPECTION CERTIFICATE

This is to certify that a preliminary inspection has been made of the piping at No. .....Street, for..... outlets, before the piping was enclosed out of sight, and it was found to comply with our specifications.

As there is some danger that damage may be done to the piping during the various stages of construction, a request for second inspection should be made after the piping has been closed in.

The United Gas Improvement Company

.....

Superintendent

.....192..

23. SECOND INSPECTION

The second inspection is principally one of *pressure,* and before it is applied for, all carpenter and other building work that might disturb the piping, *must be finished.* It consists of a test by the Company's Inspector, of the system of piping, under a pressure of 3 pounds per square inch, or 6 inches of mercury column. The column must show no drop for a period of 10 minutes. The Second Inspection is made after the piping has been enclosed, and is ready for the fixtures, but before the fixtures are installed; it will not be made until after the last, or white coat of plaster is on. To obtain this inspection, the fitter must:

a. Screw caps on every outlet, so that the Inspector can make the pressure test. Omission of caps or use of cement to plug piping (either at the bottom of the riser or at any outlet) will be sufficient cause for the Inspector to refuse to pass the inspection.

b. Test the piping with his own pump and gauge, before requesting inspection.

c. Send request for inspection to District Shop.

24. SECOND INSPECTION CERTIFICATE

a. If the applicant, after obtaining the certificate of Second Inspection installs the fixtures he should apply for the Third Inspection, for which see paragraph 33.

b. If the Second Inspection certificate is refused, the cause of the refusal will be explained to the applicant, who is required to remedy the defects.

c. If the piping is approved, the following certificate is given:

SECOND INSPECTION CERTIFICATE

This is to certify that an inspection has been made of the piping at No. .....Street, for.....outlets, and it was found to comply with our specifications.

As injury may occur to the piping subsequent to this inspection, its future soundness is not guaranteed.

The United Gas Improvement Company

.....

Superintendent

.....192..

25. NEW PIPING IN COMBINATION WITH OLD

a. A system of new piping that is to be joined to a system of old piping, thus constituting an extension to the old piping, requires the regular First Inspection, before being jointed to the old piping. After the certificate is issued on this First Inspection, and the new piping is connected to the old piping, the fitter should request another inspection, in which the whole enlarged system of piping will be required to stand a pressure of 6 inches of water column, showing no drop in 10 minutes. This applies whether or not any fixtures are on the old or new systems of piping.

b. In case the building is occupied, the new piping may be inclosed prior to the First Inspection, as explained in (f) paragraph 21.

c. As the test of 6 inches of water column required on the whole enlarged system might reveal leaks previously existing in the old piping, applicants are cautioned, when bidding on this class of work, to have this point clearly understood with the property owner or builder.

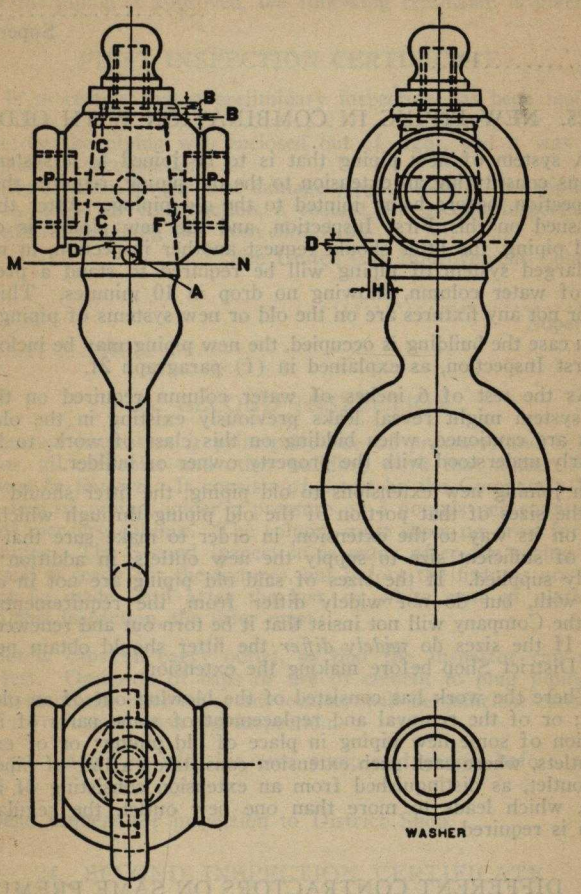
d. In joining new extensions to old piping, the fitter should carefully examine the sizes of that portion of the old piping through which the gas will flow on its way to the extension, in order to make sure that said old piping is of sufficient size to supply the new outlets, in addition to those it formerly supplied. If the sizes of said old piping are not in *exact accordance* with, but do not widely differ from, the requirements of the schedule, the Company will not insist that it be torn out and renewed on that account. If the sizes do *widely differ* the fitter should obtain permission from the District Shop before making the extension.

e. Where the work has consisted of the blowing out of an old system of piping; or of the removal and replacement of some parts of it; or of the insertion of some new piping in place of old piping; or of extensions to new outlets, where each such extension consists of a line of pipe to only one new outlet, as distinguished from an extension consisting of a system of piping, which leads to more than one new outlet, the regular Third Inspection is required.

25-A. DIFFERENT CONTRACTORS ON SAME PREMISES

When two or more systems of piping, intended to be supplied by the same meter, are to be installed by more than one contractor, the one last in readiness for first inspection should connect to the other system or systems before applying for inspection, providing the fixtures or appliances on the latter have not been installed. If fixtures or appliances have been installed, an inspection should be applied for before this connection, and the connection made after the inspection has been passed. After this has been done the certificate of inspection will be issued.

STANDARD PHILADELPHIA FIXTURE COCK



CHAPTER 3

Fixtures

26. COCKS

This specification aims to provide a cock of good wearing qualities, without limiting the taste of the designer on questions of appearance or finish. The dimensions given are the minimum, there being no objection to larger sizes being used. The drawing on page 312 is merely conventional, and is intended to show only those dimensions that are specified herein.

a. The material of both plug and body should be free from all defects, and of such grade that constant use will not cause excessive wear.

b. The end of the plug should have two flat sides for the washer, and two nuts (a main nut and a jamb nut of Boston type) should be used instead of a tail screw. The plug and the male thread on the end of the plug should preferably be made of one piece; if made of two pieces, the nipple forming the male thread on the end of the plug, should be screwed and sweated with hard solder, into the plug.

c. The bearing surface for the washer on the cock body, should be not smaller in diameter than the diameter of the washer. The washer should bear evenly on the face of the body.

d. The plug should stop at 90 degrees in either direction when shut off, but when the cock in question is a main by-pass cock, it may be a quarter-turn cock. The plug should be thoroughly and properly ground, and not merely tool finished. The question of thorough grinding is of great importance; any sign of insufficient grinding will cause the rejection of the cock. The cock should be perfectly gas-tight, without an excess of grease, under a pressure of 6 inches of water column, while the plug may be turned by hand.

e. For turned cocks, the thickness F of the body wall at the gas-way should be not less than $\frac{3}{32}$ inch. For cast cocks the thickness of the body wall at any point, including the part that forms the mitre, should be not less than $\frac{3}{32}$ inch.

f. That tapered hole through the body should be recessed at the small end to a diameter at least .003 inch larger than the diameter of the small end of the plug; this is done to prevent the formation by wear of a shoulder in the small end of the tapered hole in the body.

g. The gas-way through both the body and the plug should be not less than $\frac{1}{8}$ inch diameter. The gas-way in the plug should register with the gas-way in the body.

h. Neither of the two distances B, provided to take up for wear, should be less than $\frac{1}{32}$ inch.

i. Neither of the two bearing surfaces C, on either side of the gas-way, should be less than $\frac{3}{16}$ inch.

j. The distance D, provided to take up for wear, should be not less than $\frac{1}{32}$ inch.

k. The seal between the gas-ways in plug and body, when the key is hard over, should not be less than $\frac{3}{16}$ inch.

l. The stop pin A should be screwed or driven into place. If a driven pin is used, it should be made of soft annealed metal.

m. The diameter of the stop pin should be as follows: If a driven pin, not less than $\frac{1}{16}$ inch; if a screwed pin, not less than $\frac{3}{32}$ inch. No portion of any $\frac{1}{16}$ inch diameter pin should extend below the mitre, that is, below the line M N. Any pin $\frac{3}{32}$ inch in diameter, or larger, may extend $\frac{1}{64}$ inch below the mitre.

n. The length H of the stop pin should be not less than 1/16 inch.

o. The key and the gas-way should be straight on the axis of the body when gas-way is open.

p. The key and the plug should preferably be formed of one piece of metal; if not, the two pieces should be firmly attached by sweating with hard solder.

q. The cock body should have at the screw point P not less than five full threads.

27. SWING JOINTS

Swing joints should be so assembled, that the weight of the fixture has a tendency to seat the plug in the body.

28. STEMS

a. The sizes of pipe or tubing in the stems of pendants, or of wall brackets, should be not smaller than those in the following schedule:

Length of Stem	Number of Burners	When Made of Iron Pipe		When Made of Brass Tubing		Gas-Way Through Cock
		Cased	Uncased	Plain	Chain	
30 inch and under	1-2	1/8 inch	1/4 inch	3/8 inch	3/8 inch	1/8 inch
Over 30 inch & under 42 inch	1-2	1/4 "	1/4 "	7/16 "	3/8 "	1/8 "
42 inch and over	1-2	1/4 "	3/8 "	7/16 "	3/8 "	1/8 "
Any length	3-6	1/4 "	3/8 "	1/2 "	3/8 "	3/16 "
" "	7-12	3/8 "	1/2 "	1/2 "	3/8 "	3/16 "
	13 & over	1/2 "	3/4 "	3/4 "	1/2 "	1/4 "

"Length of Stem" is understood to be a distance measured as follows:

In pendants, a straight line from the stiff joint to the lowest point of the pendant;

In brackets that carry more than one burner, a straight line from the stiff joint to the point where the arms diverge.

b. A one-piece or harp pendant, if not over 33 inches long, may be made of 1/8 inch iron pipe or 3/8 inch brass tubing. If longer than 33 inches, it should conform to the schedule.

c. In the case of wall brackets, that carry more than one burner, the sizes given in the schedule are correct, except that no pipe of smaller size than 1/4 inch should be used.

29. ARMS

a. Arms of pendants or of wall brackets, that is, those parts which carry gas for only one burner, should be made not smaller than the sizes in the following schedule:

Length of Arm	When Made of Iron Pipe		Brass Tubing
	Cased	Uncased	
12 inch and under	1/8 inch	1/8 inch	3/8 inch
Over 12 inch and under 18 inch	1/8 "	1/4 "	7/16 "
Over 18 inch	1/4 "	3/8 "	1/2 "

"Length of Arm" is understood to be a distance measured as follows:

In pendants, a straight line from the centre of the stem to the centre of the burner nozzle;

You'll find the Classified Building Trade Directory, toward the end of the book, a great convenience. Use it.

In stemless wall brackets, as stiff, single swing or double swing brackets, carrying but one burner, a straight line from the stiff joint to the centre of the burner nozzle, measured when the bracket has its maximum reach;

In stemmed wall brackets, a straight line from the point of divergence of the arm to the centre of the burner nozzle.

b. In the case of cast wall brackets, the area of the gas-way in stems and arms should be not less than the area of the pipe, or tubing, of equivalent lengths, of the sizes already specified.

30. GENERAL

a. Special precautions should be taken in the construction to prevent the obstruction of the gas-way by foreign matter, such as solder, other jointing material, or metal chips. The ends of tubing should be reamed to remove burrs. When duplex tubing is used, care should be exercised to prevent faulty alignment of gas-ways.

b. Gas fitters' cement should not be used on any part of the fixture where it may be affected by the heat from the burners. Where solder is used, it should be of such a mixture that it will not be affected by the heat from the burners.

c. Fixtures for out door use, or in exposed situations, should be provided with suitable drips, or means for the convenient removal of condensation from any part of the fixture in which such condensation may accumulate.

d. Globe rings should fit snugly over the threads of the burner nozzles, and should be so constructed that the screwing on of the burner will be certain to bind the globe ring firmly between the burner and the shoulder of the burner nozzle. Globe rings should have ample openings for the admittance of the proper quantity of air to the burners.

e. The Company reserves the right to take fixtures apart at any time, and to refuse to pass them, if they are not constructed in accordance with good workmanship.

f. The above requirements refer to combination fixtures as well as to plain gas fixtures. Where there are good reasons for making the stems of combination fixtures, supplying less than six lights, of smaller size than ¼ inch pipe, the matter should be taken up with the Company by the fixture manufacturer.

31. OLD FIXTURES

In general, old fixtures, equipped with cocks that will not turn all the way around, will be approved if they appear strong enough to support the burners with which they are equipped, have sufficient gas-way to supply the necessary gas, and pass the regular Third Inspection. Pressure test 2-15-22.

32. REASON FOR INSPECTION

New fixtures must conform to the specifications in paragraphs 26 to 30. To insure this and to make sure that the fixtures are properly installed, the following system of inspection has been established.

33. THIRD INSPECTION

The Third Inspection is principally one of *fixtures*, and, being the final test, it should not be applied for until the piping and fixtures are *ready to receive gas.* It consists of a test by the Company's Inspector, of a system of piping and fixtures, under a pressure of 6 inches of water column. The column must show no drop for a period of 10 minutes. This Third Inspection is made after the fixtures have been installed, and the system is supposed to be ready for gas. To obtain this inspection, the fixture dealer or fitter must:

a. See that all outlets are supplied with fixtures. If any outlet is not to be supplied, notice to this effect should be given when requesting third inspection.

b. See that all fixture keys are adjusted so they may be turned by hand.

c. Screw all fixtures up tight before making test, and leave them tight after test is made.

d. See that fixtures are fully equipped with burners. All flat flame burners should be preferably 2-15-22 of the union jet type.

e. On burners equipped for electric ignition, open all keys not controlled by electricity, and, which, therefore, under normal conditions of working remain open, the flow of gas being held back by the apparatus controlled by electricity.

f. Test the piping and fixtures with his own pump and gauge before requesting inspection.

g. Send a request for inspection to the District Shop.

h. Fixture dealers *must test the piping,* and, if necessary, have repairs made, to *insure* that the piping is tight *before the fixtures are installed.* Fixture dealers hang fixtures on leaky piping at their own risk.

i. As piping may have been rejected for reasons other than tightness, it does not follow that because piping is found tight, First Inspection has been passed. Therefore, as a certificate of Third Inspection will not be issued even if fixtures prove tight, until First Inspection has been passed, fixture dealers are urged to ascertain, before installing fixtures, whether First Inspection has been passed.

34. THIRD INSPECTION CERTIFICATE

a. If the Third Inspection certificate is refused, the cause of the refusal will be explained to the applicant, who is required to remedy the defects.

b. If the piping and fixtures are approved, the following certificate is given:

THIRD INSPECTION CERTIFICATE

This is to certify that an inspection of the piping and fixtures at No. ..... Street, for ..... burners, has been made and they have been found to comply with our specifications.

As injury may occur to the piping and fixtures subsequent to this inspection, their future soundness is not guaranteed.

The United Gas Improvement Company,

....., Superintendent.

....., 192 .

CHAPTER 4

Miscellaneous

35. TURNING GAS OFF AND ON

a. The Company reserves the sole right to first turn gas into any new piping; or into any old piping which has been blown out; or taken apart and put back; or repaired; or extended; or partially replaced with new pipe; or fixtures removed or re-hung; or new fixtures hung. Therefore, in all cases where the applicant has turned the gas off at the meter to do any such work, he should apply to the Company to turn it on again.

b. Where the fitter has turned off the gas, he should complete his work and apply for a gas turn on *as early in the day as possible*, so as to insure a supply before darkness. If the job cannot be completed in one day, the fitter should cap up the piping so that gas may be used for the night, and the Company will thus turn on the gas day after day, while the work continues. The telephone may, of course, be used in applying for gas turn on. When fitters turn off the gas for the purpose of working on the pipes or fixtures, they should use the cock at the meter in the cellar. The cock at curb should not be used.

c. The Company hereby notifies gas fitters that it reserves the sole right to disconnect, remove, or reset gas meters, and to disconnect, remove and replace the plug at end of service pipe, and the piping between the service and meter.

d. The Company hereby notifies gas fitters that when the service, meter connections, or meter unions have been sealed by the Company, the seal must not be broken under any conditions, except as permitted by (e) below.

e. If the fitter desires to do work authorized, or work not specifically prohibited by these rules, such as blowing out piping, which will require the unscrewing of the meter outlet, he should give the Company one day's notice of his desire. The Company will have a man call the day following receipt of notice to break the seal. After this, the fitter may proceed with his work and, not later than the day following its completion, should notify the Company to reseal the meter.

36. BUILDERS' CO-OPERATION

The First Inspection requires the Company's Inspector to visit the building, after the piping is completed and before it is closed in. Builders are requested to co-operate with the Company at this point. The Company's inspection is a safeguard to the builder. Inspectors are instructed to be particularly prompt on First Inspection orders, so as to cause no delay in building operations, or to reduce any necessary delay to the shortest possible length.

Builders are requested to co-operate with the Company by requiring the fitters to present the proper certificate of inspection before they will pay the fitters for their work.

37. OPENING LEFT FOR SERVICE

Provision should be made, especially where the walls are very thick, for the entrance of a gas service pipe through the foundation walls to new buildings. The preferable arrangement is to build a sleeve of iron, or terra cotta, pipe in the wall at the point where the service is designed to enter. In order that the sleeve should be right as to size and location, the proper District Shop should be communicated with, so that a representative may be sent to examine the plans, furnish a suitable sleeve, if

necessary, and superintend its placing. In this way, architects and builders will be saved the annoyance of having walls cut into, and will also confer a favor on the Company. Architects are asked to embody in future specifications, a clause obligating the contractor to arrange with the Company for the placing of a proper sleeve, as above explained.

38. SUNDRY DETAILS

a. All pressure tests by the Inspector will be made with the Company's pump and gauge.

b. Applicants for inspection need not be present during any inspection by the Company's Inspector; but the Company advises them to be present as often as possible.

c. If an inspection shows a system to be satisfactory, a tag marked "This System Has Passed (First, Second or Third, as the case may be) Inspection" will be attached to the piping (or fixtures); and the certificate will be mailed to the applicant's address from the District Shop.

d. If an inspection shows a system to be unsatisfactory, the Inspector will explain the defects to the applicant, if present; a tag marked "This System has failed to pass (First, Second or Third, as the case may be) Inspection" will be attached to the piping (or fixtures); and the applicant will be notified by mail from the District Shop.

e. Applicants are cautioned to be very careful, before requesting inspection, to see that the work to be inspected and tested is complete, and is in every way in proper condition to permit the Inspector to make his examination and test promptly and without doing extra work. Applicants should *always* test the work with their own pump and gauge immediately before applying for an inspection; they will thus be sure to avoid such things as omitted caps, unfinished runs of pipe, incomplete fixtures, etc. The presence of such things, indicating carelessness, and making it evident that no preliminary test has been made, will be sufficient cause to reject the work.

39. ADDRESSES OF DISTRICT SHOPS

Requests for inspections should be sent to the Shop in the district in which the work is done. The Inspectors' headquarters are at the District Shops. To obtain any special information, or make any unusual request, the applicant should apply at the District Shop. The District boundaries are as follows:

CITY DISTRICT: All that part of the city lying between the Delaware and Schuylkill Rivers and South of the north line of Vine Street. Leave orders at District Shop, 1931 South Ninth Street.

WEST PHILADELPHIA DISTRICT: All that part of the city lying west of the Schuylkill River. Leave orders at District Shop, 4650 Market Street.

SPRING GARDEN DISTRICT: All that part of the city bounded by the Schuylkill River, north line of Vine Street, Delaware River, south line of Pennsylvania Railroad (Delaware River Bridge Route), south line of Pennsylvania Railroad (New York Division), east line of Sixth Street, north line of Cayuga Street, centre line of Germantown Avenue, south line of Philadelphia & Reading Railway, centre line of Roberts Avenue, east line of Pennsylvania Railroad (Germantown Branch), northwest line of Hunting Park Avenue, east line of Ridge Avenue, north line of Lehigh Avenue to the Schuylkill River. Leave orders at District Shop, 1615 North Ninth Street.

GERMANTOWN-FRANKFORD DISTRICT: All that part of the city bounded by the Delaware River, south line of Pennsylvania Railroad (Delaware River Bridge Route), south line of Pennsylvania Railroad (New

York Division), east line of Sixth Street, north line of Cayuga Street, centre line of Germantown Avenue, south line of Philadelphia & Reading Railway, centre line of Roberts Avenue, east line of Pennsylvania Railroad (Germantown Branch), northwest line of Hunting Park Avenue, east line of Ridge Avenue, north line of Lehigh Avenue to the Schuylkill River. Leave orders at District Shop, 20 Maplewood Avenue.

Specifications
on
FLUE CONNECTIONS
on
Gas Appliances

FLUE CONNECTIONS

1. DEFINITIONS

A flue connection is a pipe or conductor connecting the gas appliance to the outside air at a point where the free discharge of the burnt gases is not objectionable, or to a chimney, flue, or duct constructed and to be used for venting purposes only.

A "yellow" flame heater is one burning gas unmixed with air. The flames are yellow from their tip to within a short distance of the burner.

2. CONDITIONS WHERE FLUE IS REQUIRED

A flue is always required on the following gas-burning appliances:

a. Automatic Storage Water Heaters.
b. Automatic Instantaneous Water Heaters.
c. Tank or Circulating Water Heaters
   Consuming gas at rate of more than 50 cubic feet per hour.
   When equipped with distant control device.
   When located in bedroom or bathroom.
d. House Heating Plants (hot water, steam, vapor and warm air).
e. Garbage Incinerators.
f. Gas Logs.
g. Any gas appliance designed for use in a fireplace, and which burns gas at rate of more than 50 cubic feet per hour.
h. Any gas appliance located in bathroom, except "yellow" (see par. 1) flame room heaters burning gas at rate of 30 cubic feet or less per hour.
i. Any other gas appliance, which burns gas at rate of more than 50 cubic feet per hour, except gas ranges, cookers, laundry stoves or hot plates located in kitchen or laundries, and except appliances in factories.
j. Whenever, in the opinion of the Company, local conditions are such as to warrant a flue connection, even when such connection is not required by (a) to (i) of this paragraph.

3. SPECIFICATIONS FOR INSTALLING FLUE

Nothing in this paragraph shall be interpreted as conflicting with any Ordinances, Code or Regulation which may be enforceable by municipal authorities.

a. Material—
Inside, except in cellar or basement, material should be blued steel, not less than 26 gauge.
In cellar, or basement, or on outside, of galvanized steel of above gauge.

b. Size—
No flue pipe should be smaller than 3" in diameter.
No flue pipe should be of smaller area than the flue opening provided on the appliance.

c. Continuous Connection—
A continuous connection is required between appliance and chimney, or main flue, or outside, as the case may be, except for appliances designed for use under canopies, in fireplaces, etc.

d. Back Draft Diverter—
A back draft diverter (see figures 1 and 2) is required on every continuous flue connection, unless the appliance manufacturer has built in, or otherwise furnished as part of the appliance, some equally efficient means of checking draft. Back draft diverter should be placed as close as possible to the appliance, and always on a vertical run.

e. Damper—
No damper should be installed, unless, after trial, it is proven necessary. Damper, if used, should have hole in centre at least one inch in diameter.

f. Connection to Main Flue—
The flue from each appliance should preferably enter chimney through a separate hole, but if this is not feasible, flues may be joined only at their point of entrance to chimney. Area of flue between junction and chimney should at least equal combined area of flues that have been joined.

g. Run to Outside—
Where no main flue, or chimney, is available, connection should be carried to outside, preferably through wall, or if this is not possible, through window. In latter case, movement of sash should be prevented from disturbing flue pipe. Outside, vertical runs only are permitted, not more than 10, or less than 3 feet long. Edge of cap on top of flue should be at least 6 inches clear of wall.

h. Positive Draft—
The draft, as indicated by lighted match or candle held at back draft diverter of appliance after connection, but not while burning, should be "positive," while other appliances connected to same flue are in normal seasonal use.

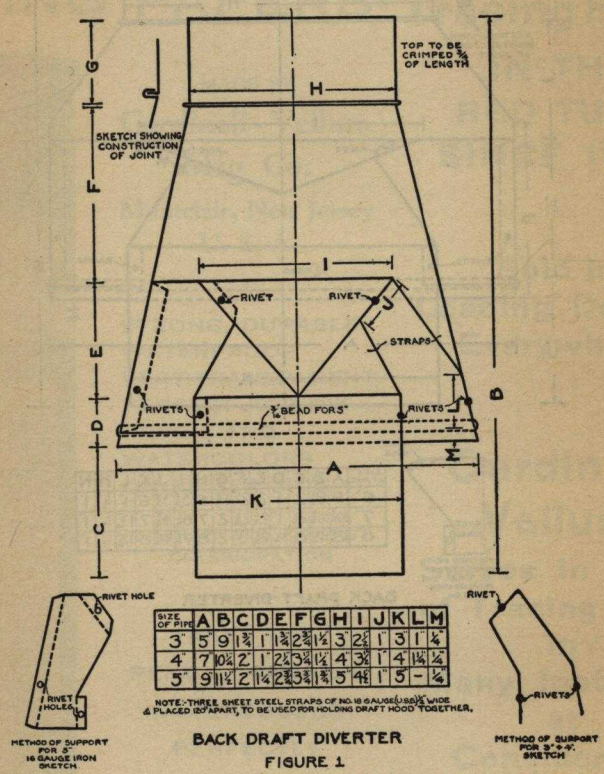
i. Lath and Plaster—
Pipe run through lath and plaster partitions should pass through a brick collar, of diameter 1 inch larger than pipe.

j. Flue Installed When Not Required—
When a flue connection is required, it should meet the specifications under this heading; when installed, though not required, no variation from specifications should exist which may restrict draft, or create or increase accident or fire hazard.

k. General—
General requirements are, short length, good rise, few bends, well-fitted joints, and secure support.

The Classified Building Trade Directory lists just those things used in building construction and equipment. Saves time and worry.

BACK DRAFT DIVERTER

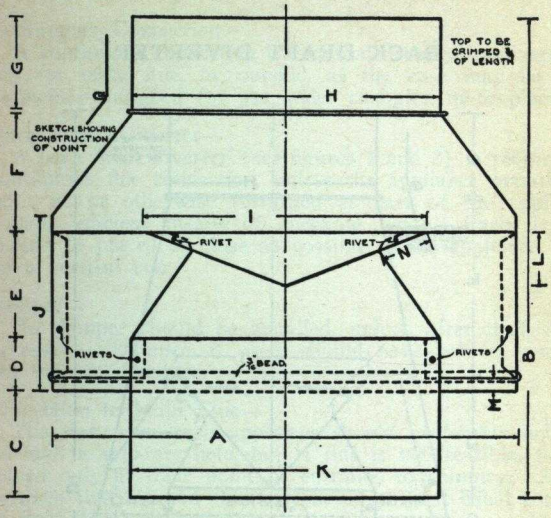


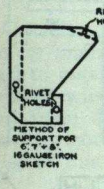
SIZE OF PIPE	A	B	C	D	E	F	G	H	I	J	K	L	M
3"	5"	9"	¾"	1"	1¾"	2¾"	1½"	3"	2½"	1"	3"	1"	¼"
4"	7"	10½"	2"	1"	2¼"	3¼"	1½"	4"	3½"	1"	4"	1¼"	¼"
5"	9"	11½"	2"	1¼"	2¾"	3¾"	1⅝"	5"	4½"	1"	5"	-	⅛"

NOTE:-THREE SHEET STEEL STRAPS OF NO. 18 GAUGE 1¼" WIDE & PLACED 120° APART, TO BE USED FOR HOLDING DRAFT HOOD TOGETHER.

BACK DRAFT DIVERTER
FIGURE 1

BACK DRAFT DIVERTER





SIZE OF PIPE	A	B	C	D	E	F	G	H	I	J	K	L	M	N
6"	9	9⅝	2"	1"	2"	2¼	1⅜	6"	5½	3⅜	6"	1"	¼"	1"
7"	10½	10⅝	2¼	1"	2¼	2⅜	2"	7"	6½	3¾	7"	1	⅛	1"
8"	12¼	11½	2¼	1⅛	2⅜	3"	2"	8"	7½	4⅛	8"	1⅜	⅛	1"

BACK DRAFT DIVERTER

FIGURE 2

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STEEL BEAMS CHANNELS

ANGLES—PLATES—BARS

AND BAR SIZES

Manufacturers' Standard Specifications
For
STRUCTURAL STEEL
Revised Nov. 24, 1922

Reprint through courtesy of Association of American Steel Manufacturers, Carnegie Steel Company Pittsburgh

1. Classes. These specifications cover three classes of structural steel, namely:

Class A steel, to be used for railway bridges, ships, cars, and similar structures.

Class B steel, to be used for buildings, highway bridges, train sheds, and similar structures.

Class C steel, to be used for structural rivets.

2. Process. a. Steel for Classes A and C shall be made by the openhearth process. Steel for Class B may be made by either or by both the openhearth or bessemer processes, except as specified in paragraph b.

b. Steel for Class B plates and angles over ¾ in. in thickness which are to be punched, shall be made by the openhearth process.

3. Chemical Composition. The steel shall conform to the following requirements as to chemical composition:

Elements Considered	Class A Steel	Class B Steel	Class C Steel
Phosphorus, max., per cent:			
Basic open-hearth	0.04	0.06	0.04
Acid open-hearth	0.06	0.08	0.04
Bessemer	....	0.11	....
Sulphur, max., per cent	0.06	....	0.05

4. Ladle Analysis. An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of the elements specified in section 3. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall conform to the requirements specified in section 3, and shall be reported to the purchaser or his representative, if requested.

5. Check Analyses. Analyses may be made by the purchaser from finished material representing each melt of Class A or Class C steel. The phosphorus and sulphur content thus determined shall not exceed that specified in section 3 by more than 25 per cent.

6. Tension Tests. The steel shall conform to the following requirements as to tensile properties:

Properties Considered	Class A Steel	Class B Steel	Class C Steel
Tensile strength, lb. per sq. in.	55,000–65,000	55,000–65,000*	46,000–56,000
Yield point, minimum, lb. per sq. in.	0.5 tens. str.	0.5 tens. str.	0.5 tens. str.
Elongation in 8 in., min., per cent	1,400,000†	1,400,000†	1,400,000
	tens. str.	tens. str.	tens. str.
Elongation in 2 in., min., per cent	22	22	

*See section 8 a. †See section 9.

7. Yield Point. The yield point shall be determined by the drop of the beam of the testing machine.

8. Modification in Tensile Strength. a. Class B steel may have tensile strength up to 70,000 lb. maximum, provided the elongation is not less than the percentage required for 65,000 lb. tensile strength.

b. In order to meet the required minimum tensile strength of full-size annealed eyebars, the purchaser may specify the tensile strength to be obtained in specimen tests; the range shall not exceed 14,000 lb. per sq. in., and the maximum shall not exceed 74,000 lb. per sq. in. The material shall conform to the requirements as to physical properties other than that of tensile strength specified in sections 6, 9 a and 10 b.

9. Modifications in Elongation. a. For Class A and Class B steels over ¾ in. in thickness a deduction from the percentage of elongation in 8 in. specified in section 6 shall be made in the proportion of 1 for each increase of ⅛ in. in thickness above ¾ in. to a minimum of 18 per cent.

b. For Class A and Class B steels under 5/16 in. in thickness a deduction from the percentage of elongation in 8 in. specified in section 6 shall be made in the proportion of 2.5 for each decrease of 1/16 in. in thickness below 5/16 in.

10. Bend Tests. a. The test specimen for plates, shapes and bars, except as specified in paragraphs b, c and d, shall bend cold through 180 deg. without cracking on the outside of the bent portion, as follows: For material ¾ in. or under in thickness, flat on itself, for material over ¾ in. to and including 1¼ in. in thickness, around a pin the diameter of which is equal to the thickness of the specimen; and for material over 1¼ in. in thickness around a pin the diameter of which is equal to twice the thickness of the specimen.

b. The test specimen for eyebar flats shall bend cold through 180 deg. without cracking on the outside of the bent portion as follows: For material ¾ in. or under in thickness, around a pin the diameter of which is equal to the thickness of the specimen; for material over ¾ in. to and including 1¼ in. in thickness, around a pin the diameter of which is equal to twice the thickness of the specimen; and for material over 1¼ in. in thickness, around a pin the diameter of which is equal to three times the thickness of the specimen.

c. The 1 by ½ in. test specimen for pins, rollers and other bars, shall bend cold through 180 deg. around a pin 1 in. in diameter without cracking on the outside of the bent portion.

d. The test specimen for rivet steel shall bend cold through 180 deg. flat on itself without cracking on the outside of the bent portion.

11. Test Specimens. a. Test specimens shall be prepared for testing from the material in its rolled or forged condition, except as specified in paragraphs b and c.

b. Test specimens for annealed material shall be prepared from the material as annealed for use, or from a short length of a full section similarly treated.

c. Test specimens for rivet bars which have been cold-drawn shall be normalized before testing.

d. Test specimens shall be taken longitudinally and, except as specified in paragraphs f, g and h shall be of the full thickness of material as rolled.

e. Test specimens for plates, shapes and flats may be machined to the form and dimensions shown in Fig. 1, or with both edges parallel; except that bend test specimens for eyebar flats may have three rolled sides.

f. Tension test specimens for plates and eyebar flats over 1½ in. in thickness and bend test specimens for plates over 1½ in. in thickness may be machined to a thickness or diameter of at least ¾ in. for a length of at least 9 in.

g. Test specimens for bars over 1½ in. in thickness may be machined to a thickness or diameter of at least ¾ in. for a length of at least 9 in.;

or tension test specimens may conform to the dimensions shown in Fig. 2. Bend test specimens may be 1 by ½ in. in section.

h. Tension test specimens for pins and rollers shall conform to the dimensions shown in Fig. 2. Bend test specimens shall be 1 by ½ in. in section.

i. The tension test specimen shown in Fig. 2 and the 1 by ½ in. bend test specimen for pins and rollers shall be taken so that the axis is 1 in. from the surface; and for other bars over 1½ in. in thickness, midway between the center and surface.

j. The machined sides of rectangular bend test specimens may have the corners rounded to a radius not over 1/16 in.

12. Number of Tests. a. One tension and one bend test shall be made from each melt, except as specified in paragraph d. If material from one melt differs ⅜ in. or more in thickness, one tension and one bend test shall be made from both the thickest and the thinnest material rolled.

b. If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

c. If the percentage of elongation of any tension test specimen is less than that specified in section 6 and any part of the fracture is more than ¾ in. from the centre of the gauge length of a 2-in. specimen or is outside the middle third of the gauge length of an 8-in. specimen, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

d. Plates 3/16 in. and under in thickness; shapes less than 1 sq. in. sectional area; rounds (except rivet rods) under ½ in. in diameter; and squares, hexagons and flats less than ½ sq. in. sectional area, shall not be subject to tension tests.

13. Permissible Variations. a. The sectional area or weight of each structural shape, and of each rolled edge plate up to and including 36 in. in width, shall not vary more than 2.5 per cent. from the theoretical or specified amounts.

b. The thickness or weight of sheared mill plates, and of universal mill plates over 36 in. in width, shall conform to the Manufacturers' standard practice governing the permissible variations from sheared mill plates, appended to these specifications.

c. The weights of angles, tees, zees and channels of bar sizes, and the dimensions of rounds, squares, hexagons and flats, shall conform to the Manufacturers' standard practice governing the allowable variations in size and weight of hot-rolled bars, appended to these specifications.

STRUCTURAL STEEL

PLAIN—FABRICATED

HENRY A. HITNER'S SONS CO.

MAIN OFFICE
4501 Richmond St.

Regent 1865
East 9025

STRUCTURAL DEPT.
Gaul and Huntingdon Sts.

14. Finish. The finished material shall be free from injurious defects, and shall have a workmanlike finish.

15. Marking. The name or brand of the manufacturer and the melt number shall be legibly stamped or rolled on all finished material, except that rivet and other bars and small sections shall, when loaded for shipment, be properly separated and marked for identification. The identification marks shall be legibly stamped on the end of each pin and roller. The melt number shall be legibly marked, by stamping if practicable, on each test specimen.

16. Inspection. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

17. Rejection. Material which develops injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

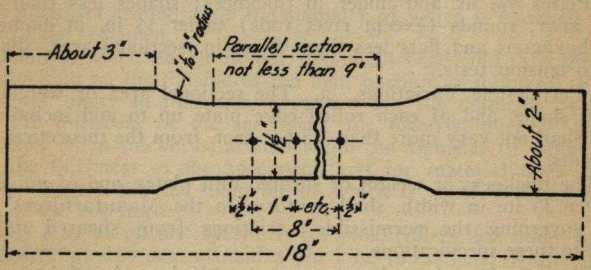
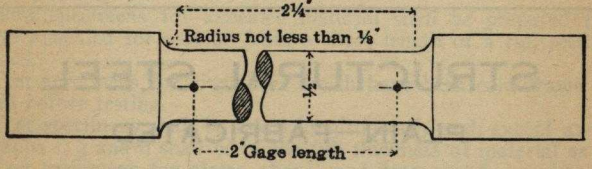


Fig. 1



Note:- The gage length, parallel portions and fillets shall be as shown, but the ends may be of any form which will fit the holders of the testing machine in such a way that the load shall be axial.

Fig. 2

MANUFACTURERS' STANDARD PRACTICE

PERMISSIBLE VARIATIONS IN WEIGHT AND THICKNESS OF RECTANGULAR SHEARED PLATES

One cubic inch of rolled steel is assumed to weigh 0.2833 pound.

When Ordered to Thickness.—Each plate shall not vary more than 0.01 inch under the thickness ordered, and the overweight of each lot in each shipment shall not exceed the amount given in the following table.

Ordered Thickness Inch	Permissible Excess in Average Weight per Square Foot of Plates for Widths Given Expressed in Percentage of Nominal Weight								
	Under 48 in.	48 in. incl. to 60 in. excl.	60 in. incl. to 72 in. excl.	72 in. incl. to 84 in. excl.	84 in. incl. to 96 in. excl.	96 in. incl. to 108 in. excl.	108 in. incl. to 120 in. excl.	120 in. incl. to 132 in. excl.	132 in. incl. to 144 in. excl.
Under 1/8	9	10	12	14	..	..	..	..	..
1/8 incl. to 3/16 excl	8	9	10	12	..	..	..	..	..
3/16 incl. to 1/4 excl	7	8	9	10	12	..	..	..	..
1/4 incl. to 5/16 excl	6	7	8	9	10	12	14	16	19
5/16 incl. to 3/8 excl	5	6	7	8	9	10	12	14	17
3/8 incl. to 7/16 excl	4.5	5	6	7	8	9	10	12	15
7/16 incl. to 1/2 excl	4	4.5	5	6	7	8	9	10	13
1/2 incl. to 5/8 excl	3.5	4	4.5	5	6	7	8	9	11
5/8 incl. to 3/4 excl	3	3.5	4	4.5	5	6	7	8	9
3/4 incl. to 1 excl	2.5	3	3.5	4	4.5	5	6	7	8
1 or over	2.5	2.5	3	3.5	4	4.5	5	6	7

Note.—The weight of individual plates ordered to thickness shall not exceed the nominal weight by more than 1⅓ times the amounts given in the above table.

When Ordered to Weight per Square Foot. Each lot in each shipment shall not vary from the weight ordered more than the amount given in the following table.

This table shall not be used when a minimum edge thickness is required. In such cases the table of permissible variations for plates ordered to thickness shall apply.

Ordered Weight Pounds per Square Foot	Permissible Variations in Average Weight per Square Foot of Plates for Widths Given, Expressed in Percentage of Ordered Weight																	
	Under 48 in.		48 in. incl. to 60 in. excl.		60 in. incl. to 72 in. excl.		72 in. incl. to 84 in. excl.		84 in. incl. to 96 in. excl.		96 in. incl. to 108 in. excl.		108 in. incl. to 120 in. excl.		120 in. incl. to 132 in. excl.		132 in. incl. to 144 in. excl.	
	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under	Over	Under
Under 5	5	3	5.5	3	6	3	7	3	...	...	...	...	...	...	...	...	...	...
5 incl. to 7.5 excl.	4.5	3	5	3	5.5	3	6	3	...	...	...	...	...	...	...	...	...	...
7.5 incl. to 10 excl.	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3	...	...	...	...
10 incl. to 12.5 excl.	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3	9	3
12.5 incl. to 15 excl.	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3
15 incl. to 17.5 excl.	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3
17.5 incl. to 20 excl.	2.5	2	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3
20 incl. to 25 excl.	2	2	2.5	2	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3
25 incl. to 30 excl.	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3	4.5	3	5	3
30 incl. to 40 excl.	2	2	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3	4.5	3
40 or over	2	2	2	2	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3

Note.—The weight per square foot of individual plates shall not vary from the ordered weight by more than 1⅓ times the amounts given in the above table.

The term "lot" applied to these tables means all of the plates of each group width and each group thickness or weight.

MANUFACTURER'S STANDARD PRACTICE

ALLOWABLE VARIATIONS IN THE SIZE AND WEIGHT OF HOT-ROLLED BARS

Adopted 1910

I. Allowable Variations in the Weight of Bar Sizes of Angles, Tees, Zees and Channels. For bar sizes of angles, tees, zees and channels, the following average variations in weight will be permitted for sections of the various dimensions and thicknesses stated, namely:

Dimensions	Thickness	Variation in Weight, Over and Under
Any dimension over 1½ inch	Over $\frac{3}{16}$ inch	4 per cent
All dimensions 1½ inch and less	Over $\frac{3}{16}$ inch	5 per cent
Any dimension over 1½ inch	$\frac{3}{16}$ inch and less	6 per cent
All dimensions 1½ inch and less	$\frac{3}{16}$ inch and less	7 per cent

NOTE.—A channel is in "bar" size when its greatest dimension is less than 3 inches. An angle, tee, or zee is in "bar" size when its greatest dimension is less than 3 inches; or when it is 3 inches or more and at the same time the thickness is less than ¼ inch.

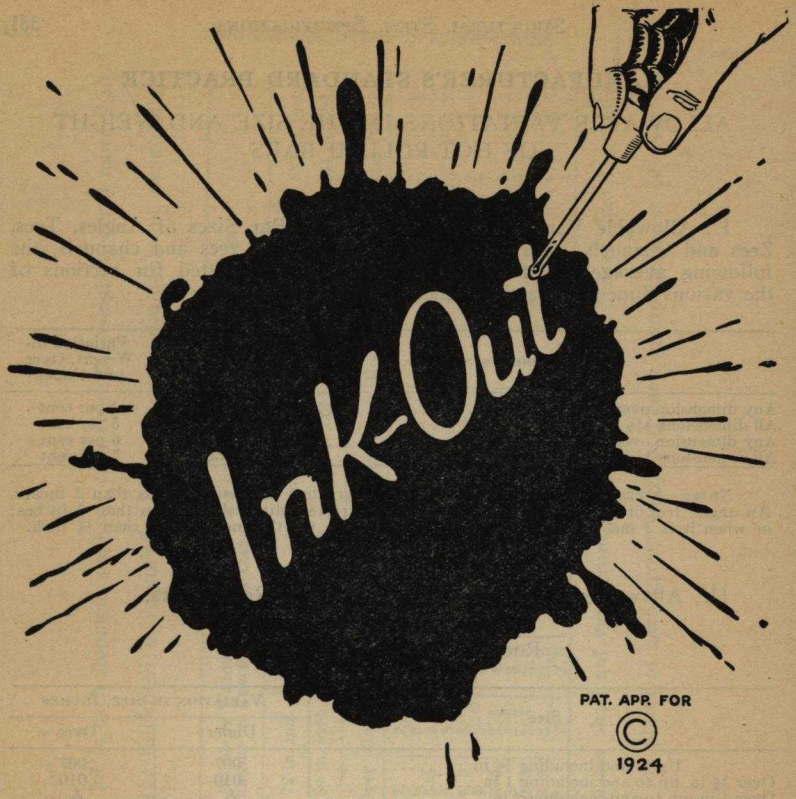
II. Allowable Variations in the Size of Hot-Rolled Bars.

ROUNDS, SQUARES, HEXAGONS

Size	VARIATION IN SIZE, INCHES	
	Under	Over
Up to and including ½ in.	.007	.007
Over ½ in. up to and including 1 in.	.010	.010
Over 1 in. up to and including 2 in.	$\frac{1}{64}$	$\frac{1}{32}$
Over 2 in. up to and including 3 in.	$\frac{1}{32}$	$\frac{3}{64}$
Over 3 in. up to and including 5 in.	$\frac{1}{32}$	$\frac{1}{32}$
Over 5 in. up to and including 8 in.	$\frac{1}{16}$	$\frac{1}{8}$

FLATS

Width of Flats	Variation in Width, Inches		VARIATION IN THICKNESS, INCHES, UNDER AND OVER			
			Thickness of Flats			
	Under	Over	$\frac{3}{16}$ in. and under	Over $\frac{3}{16}$ in. up to ½ in.	Over ½ in. up to 1 in.	Over 1 in. up to 2 in.
Up to and including 1 in.	$\frac{1}{64}$	$\frac{1}{32}$	.006	.008	.010	..
Over 1 in. up to and including 2 in.	$\frac{1}{32}$	$\frac{3}{64}$	.008	.012	.015	$\frac{1}{32}$
Over 2 in. up to and including 4 in.	$\frac{3}{64}$	$\frac{1}{16}$	.010	.015	.020	$\frac{1}{32}$
Over 4 in. up to and including 6 in.	$\frac{1}{16}$	$\frac{3}{32}$	.010	.015	.020	$\frac{1}{32}$



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Rules and Regulations in Regard to School House Construction

Issued by the

STATE BOARD OF EDUCATION

HARRISBURG

Reprint through the courtesy of Mr. Hubert C. Eicher
Director, Bureau of School Buildings

REQUIREMENTS AND RECOMMENDATIONS

I. THE SCHOOL SITE

1. General Requirements:

All school house sites shall be convenient of approach from the public highway. If possible an elevation, affording natural drainage, should be selected. A central location is to be desired but accessibility, slope of the land, and surface support in mining districts are equally important.

2. Size of Plot:

(a) City, borough and town sites, when possible, shall contain at least thirty (30) square feet per pupil, exclusive of the space occupied by the school buildings thereon.

(b) The rural school site shall contain not less than one (1) acre, and two (2) if possible to secure the ground.

3. High schools, wherein agriculture, manual and domestic arts are taught, should maintain a demonstration plot of four (4) acres or more, located on the school grounds or within two miles of the building.

4. In order to secure the best use of the site it is recommended that not more than twenty (20) per cent. of the entire site be occupied by the building.

5. Playground:

The straight line or right angle building, bordering on one or two sides of the plot, provides an inner court of larger play space.

Code—Section 604.

(a) No school building shall be erected without a proper playground being provided therefor.

(1) At least thirty (30) square feet per pupil shall be provided in other than rural disticts.

(2) Not less than one (1) acre shall be provided in rural communities.

(b) Section 629.

The board of school directors in each school district shall, when they are not otherwise provided, purchase a United States flag, flagstaff, and the necessary appliances therefore, and shall display said flag upon or near each public school building in clement weather, during school hours, and at such other times as the said board may determine.

II. PLANS AND SPECIFICATIONS

1. Code—Section 615.

(a) No public school buildings shall be contracted for, constructed or reconstructed, in any school district of the second, third or fourth class, until their plans and specifications have been submitted to the State Board

of Education and any recommendations concerning the same by the State Board of Education have been laid before the Board of School Directors.

(b) No building shall be erected from plans previously used until a second approval has been issued.

(c) All plans and specifications of portable buildings must be approved for each construction made therefrom.

(d) School boards shall not erect more than one building from standard plans submitted without the approval of the State Board of Education. Each building erected must be approved separately.

2. Two complete sets of plans and specifications shall be submitted to the State Board of Education for examination and approval. One set shall be filed and the other, with the report of the State Board of Education, returned to the sender.

4. All plans and specifications (including General Construction, Heating and Ventilating, on which must appear the manufacturer's name and address, Electric Wiring, Plumbing, etc.) must bear the following:

(a) Name of School.

(b) District (Borough or Township) for which the plans were prepared.

(c) County (location of building).

(d) Architect's name and address—required on general plans only.

(e) Scale used on plans.

(f) Schedule of Materials. Exterior walls—brick, stone or frame.

(g) Drawings should show clearly what the plans cover—new building, reconstruction or addition. Where additions are made, the old and new parts should be marked.

(h) Date on which the architect completed the plans, revised plans, sketches, etc.

(i) Compass.

(j) On all floor plans, all rooms, windows, and doors must be numbered consecutively, as

Sub-basement, B1, B2, B3, etc.
Ground floor, 1, 2, 3, etc.
First floor, 101, 102, 103, etc.
Second floor, 201, 202, 203, etc.
Third floor, 301, 302, 303, etc.

And throughout all sections and elevations, and in specifications and correspondence, references to any or several rooms, windows, or doors should be made by its number.

5. (a) Plans should be clear and legible and show definite measurements and details—floor areas, story heights, lighting area (glass sizes), heating and ventilating (flues, vents, radiators), exact location of stairways, cloak rooms, vestibules, etc.

(b) The plans shall show the size, number, arrangement and system of toilet installation to be made.

6. It is advisable to submit the preliminary sketches to the State Board of Education, so that if any changes are recommended they can be incorporated in the finished prints and specifications.

7. The specifications of heating and ventilating systems to be approved for school purposes must contain a statement guaranteeing that the system of heating and ventilating described will heat each class room and recitation room to 70 degrees Fahrenheit in zero weather and provide at least thirty (30) cubic feet of fresh air per minute for each pupil to be accommodated.

8. (a) A plot plan either in blue print or pencil shall be furnished of all building sites. Boundary dimensions should be given and adjoining properties indicated.

(b) Approximate location of building on the site.

(c) The finished grade line must appear on all elevations.

9. (a) Before being submitted to the State Board of Education for examination and approval, all plans and specifications must be considered by the local School Board for whom they were prepared.

(b) A letter of explanation should accompany all plans and specifications submitted.

III. CLASS ROOMS

GRADE

1. Size:

(a) Elementary and Grade Class Rooms should measure twenty-three (23) feet by thirty (30) feet and at least twelve (12) feet high. A room twenty-four (24) feet by thirty-two (32) feet with minimum ceiling height of twelve (12) feet is approved for forty (40) pupils.

(b) The width of the class room shall not exceed twice its height.

2. Height:

No school room ceiling height shall be less than twelve (12) feet except in portable and temporary buildings, which should provide a height of not less than eight (8) and ten (10) feet respectively. The required cubical contents will govern, to a certain extent, the height of class room ceilings.

3. Seating capacity and cubical contents:

Code—Section 618.

Every school room shall have not less than fifteen (15) square feet of floor space, and not less than two hundred (200) cubic feet of air space per pupil.

4. Windows:

See lighting.

5. Floors:

Wood floors, which are superior to cement, tile or other hard materials, should be double, securely tongued, firmly nailed to the joists, and should carry between the rough flooring and the finish, a layer of deadening felt.

6. Finish.

(a) Plain wood work should be used throughout. It should be light in color; natural color with a dull surface is best.

(b) A cement finish and not wainscoting should be used below the chair rail.

(c) Walls should be neutral gray or light buff; ceiling ivory white; base, brown with a dark brown stripe two (2) inches wide below window sills.

7. Blackboards:

(a) Not less than eighty (80) square feet of blackboard shall be placed substantially upon the walls of each class room.

(b) Blackboards shall be placed as follows:

(1) Primary rooms—the base of the board shall be not more than twenty-one (21) inches above the floor.

(2) Elementary rooms—the base of the board shall be not more than twenty-five (25) inches above the floor.

(3) High School rooms—the base of the board shall be not more than thirty (30) inches above the floor.

(c) Blackboard should be not less than three (3) feet six (6) inches wide. A four (4) foot width will prove to be more satisfactory and is suitable for accommodating all grades.

8. There should be at least one direct exit from every class room into the hall, corridor or vestibule adjoining.

9. Coat rooms:

(a) No school building shall be erected without providing at least one coat room. Separate rooms for boys and girls should be provided.

(b) Coat rooms shall be separate from the class room, except where the class room is ventilated through the coat room. They should be heated.

(c) Coat room doors shall open into the class room. In addition to required doors, others may lead to the halls or vestibule.

(d) Coat rooms should be at least five (5) feet wide and should be well supplied with hooks, (one (1) hook for each pupil, which shall be long enough to allow the wraps to hang clear of the wall), and shelves which can be reached easily by the small pupils.

(e) Coat rooms may be made four (4) feet six (6) inches wide if two doors are provided—entrance and exit.

10. Wardrobes:

(a) Wardrobes may be substituted for coat rooms in school buildings where inside toilets (q. v.) are provided.

(b) When wardrobes are placed in the class room, all class room ventilation shall be made through the wardrobes. Vent stacks shall be of sufficient size to ventilate both the class room and wardrobe. Separate vent stacks of ample size must be provided in wardrobes if the main flues cannot be carried through the wardrobes.

(c) Sliding or roll doors shall be placed on every section of the wardrobe and shall be provided with a check which shall not allow the doors to come nearer than 6 inches to the floor.

(d) Not more than two (2) rows of hooks should be provided in each section.

(e) Individual sections, 7½x10 inches, for wraps with shelf above and umbrella and overshoe racks are recommended.

HIGH SCHOOL

1. The general rules governing the construction of grade rooms shall apply to High School rooms, except that smaller rooms for the accommodation of small classes will be permitted.

2. Separate rooms should be provided for bookkeeping, and shorthand and typewriting in schools planning a commercial department.

3. For arrangement of laboratories, see Architectural Bulletin.

IV. LIGHTING

1. Code—Section 618.

In every school room the total light area must equal at least twenty (20) per centum of the floor space, and the light shall not be admitted thereto from the front of seated pupils.

(a) The term "total light area" means free glass area. That is, the net area after all deductions for mullions, muntins, sash, etc., have been made.

2. Unilateral lighting is recommended, however, light from the left and rear of seated pupils will be accepted, in which case the total light area should equal twenty-five (25) per centum of the floor area.

3. Light should not be admitted from both sides of the room.

4. Window mullions (jambs) should be narrow and the tops of windows should be placed as near the ceiling line as can be safely done. For grouping of windows, see plan of standard type of school room under Miscellaneous Sketches and Drawings.

Both Bell and Keystone telephone numbers make the Classified Building Trade Directory of still greater service.

5. Windows should also be placed in the walls as far to the rear of the room as possible. See plan of standard type of school room, under Miscellaneous Sketches and Drawings.

6. Window sills should be at least three (3) feet above the floor. The glass shall be at least three (3) feet four (4) inches from the floor.

7. Shades:

Window shades should be neutral gray in color, large enough not to admit rays of light from the sides, and two shades to each window fastened at the middle of the windows should be provided.

8. Outlets for artificial lighting should be arranged as shown under Miscellaneous Sketches and Drawings.

V. HEAT AND VENTILATION

A

1. Common Heating Stoves:

Code—Section 619.

(a) No board of school directors in this Commonwealth shall use a common heating stove for the purpose of heating any school room, unless such stove is in part enclosed within a shield or jacket made of galvanized iron, or other suitable material, and of sufficient height, and so placed, as to protect all pupils while seated at their desks from direct rays of heat.

2. Ventilating Room Heaters:

(a) Ventilating room heaters should be installed in all buildings not requiring a mechanical system.

(b) Window ventilators should not be used when other means of ventilation can be provided.

3. A vent shall be placed in every class or recitation room and all registers shall have an area of not less than 125 per cent. of the cross section area of the flue. Vent openings may be without registers, provided the finish corresponds to that of the class room.

4. Fresh air registers shall not be placed in the floor.

5. Foul air registers shall extend to the floor. They shall not interfere with the placing of blackboard at minimum height required (q. v.).

6. Floor intakes, when ventilating room heaters are used, shall not be permitted unless, where practicable, the intake may be limited to eight (8) feet in total length and have a rise of not less than one (1) inch to the foot.

7. Fresh air intake shall have not less than 240 square inches cross section area.

(1) Close-mesh cast iron registers are not approved.

(2) Open-mesh wire is recommended.

B

STANDARD CHIMNEY REQUIREMENTS

1. New or rebuilt chimneys shall comply with the following:

(a) Single flue for foul air and smoke shall measure sixteen (16) inches by sixteen (16) inches inside finish measurement, entire length of

chimney and shall be provided with an approved mixing box. For diagram of approved stack arrangement, see Miscellaneous Sketches and Drawings.

(b) Foul air flue with metal smoke stack in centre shall be at least 20 inches by 20 inches inside finish measurement, and carry through the centre a metal smoke stack not less than six (6) inches in diameter; preferably eight (8) inches.

(c) Smoke and vent flues should not be separate.

(d) No heater shall be placed directly in front of the foul air register. The heater jacket should be at least four (4) feet from the vent register or stack.

(e) All stacks should extend at least three (3) feet above the comb of the roof. See Miscellaneous Sketches and Drawings.

2. All chimneys in new or reconstructed buildings shall run from the foundation and no chimney shall be swung from the ceiling or wall.

3. Inside of chimneys should not be plastered, but they should be smooth and free from brick or cement projections.

C

1. Capacity Requirements:

Code—Section 621.

Every school building hereafter erected or reconstructed, whose cost shall exceed four thousand dollars ($4,000.00), or which is more than one story high, shall be so heated and ventilated that each school room and recitation room shall be supplied with fresh air at the rate of not less than thirty cubic feet (30) per minute for each pupil, and which air may be heated to an average temperature of seventy degrees Fahrenheit during zero weather.

D

1. Warm Air System:

(a) Basement warm air furnaces should always provide a fan for distributing the air throughout the building.

(b) The base of all fresh air outlets should be not less than eight (8) feet from the floor.

(c) Fresh air outlets of all mechanical systems should be equipped with diffusers and deflectors.

(d) Discharge velocity at the fresh air outlets in class rooms shall not exceed 300 feet per minute.

2. On all systems, suitable and adequate apparatus should be provided to insure the proper amount of moisture in class rooms.

VI. TOILETS

1. Location and Number of Toilets:

(a) Toilets may be located in the basement or on any floor of the school building.

(b) In new buildings of more than four (4) rooms a special room for each sex should be provided for toilet accommodations.

(c) In new buildings of not more than four (4) rooms and in all buildings erected prior to July 1, 1917, toilets may be placed in cloak rooms which open into class rooms, provided that separate cloak rooms for boys and girls are planned in connection with each class room and that the toilet installations are well screened, properly lighted and ventilated, and close fitting doors are used between the cloak rooms and adjoining class room.

(d) In buildings where wardrobes take the place of cloak rooms, separate toilet rooms for the sexes shall be provided.

(e) When toilets are located in the basement, separate stairways and separate entrances leading to boys' and girls' toilets shall be provided. Brick, stone, cement, or tile partitions should be used.

(f) Not less than one toilet for each sex for each class or recitation room is recommended, all of which shall be properly ventilated.

(g) One urinal stall for each fifteen (15) males, or fractional part thereof, should be installed.

(1) Separate urinals and stalls are recommended. The trough should be abandoned.

(h) Toilets should be centered on distances of not less than two (2) feet six (6) inches and each toilet should be enclosed and a swinging screen provided. When possible, the bowls should be placed three (3) feet apart.

4. Flush toilets:

Where running water is available or a pressure system is a part of the school equipment, water-closets should be installed.

5. Chemical Toilets:

Chemical toilets of an approved type (approved by the State Board of Education and the State Industrial Board) should be placed in all school buildings where the flush system is not feasible.

6. (a) The detached outhouse is restricted to rural districts of low valuation.

(b) When inside sanitaries are not provided, the following shall govern the erection and care of outhouses:

Code—Section 632:

The board of school directors in every district shall, with every building used for school purposes, provide and maintain in a proper manner, a suitable number of water-closets or outhouses, not less than two for each building, where both sexes are in attendance. Such water-closets or outhouses, shall be suitably constructed for, and used separately by, the sexes. When any water-closets or outhouses are outside and detached from the school building, the entrances thereto shall be properly screened, and they shall, unless constructed at a remote distance from each other have separate means of access thereto, and, if possible, for not less than twenty-five feet from such water-closets or outhouses, such means of access or walks leading thereto shall be separated by a closed partition wall, or fence, not less than seven feet high.

Code—Section 633.

The board of school directors shall keep all water-closets or outhouses, used in connection with any school building, in a clean and sanitary condition, and shall, not less than ten days prior to the opening of any term of school, and oftener if necessary, have them properly cleaned and disinfected by the use of fresh dry-slacked lime, or other proper disinfecting material.

(c) The L. R. S. type, described in Public Health Bulletin No. 51 published by the U. S. Treasury Department and issued by the Government printing office in 1914, is approved.

VII. STAIRWAYS

1. Width in all Buildings:

(a) All main stairways shall be not less than four (4) feet wide, and shall be provided with hand rails.

(b) Outside steps should have some roof protection, and steps exposed to the weather shall be covered with some abrasive material.

2. Number of:

(a) There should be two stairways in opposite ends of all two-story school buildings.

(b) Two-story buildings should have at least two means of exit from the second floor.

3. Grade Buildings:

The carriage shall be not less than ten (10) inches wide and the riser not more than six (6) inches high. All treads must be ten (10) inches wide plus the projecting nosing which should be not more than one (1) inch.

4. High School Buildings:

In high school buildings the size of carriage and riser shall be not more than eleven (11) inches and seven (7) inches respectively.

5. General:

A total rise of 6¼ inches and a tread of 11 inches, are found in many recent modern buildings.

VIII. CLASSIFICATION OF BUILDING

1. The basement of any school building which extends above the finished ground line at any one point more than 7-10 the distance from the finished basement floor to the finished ceiling and which in the estimation of the department, constitutes a building story shall be considered a story and rated as such in the classification of the building.

2. In extreme cases where the grade (slope of the land) is heavy, not more than five (5) per cent. of the basement floor may extend to the grade line in which case the semi-fireproof construction may be required in the basement and the first floor.

3. Code—Section 622:

All school buildings, two or more stories high, hereafter erected or leased in any school district of the first class in this Commonwealth shall be of fireproof construction; and in any school district of the second, third, or fourth class, every building more than two stories high, hereafter built or leased for school purposes, shall be of fireproof construction.

4. Act 357, Section 2—1917.

In all buildings hereafter erected or adapted for any of the purposes designated in this section, the auditorium shall not be located above or below the ground level.

IX. APPROVAL OF PLANS

1. The "General Approval" of plans and specifications issued by the State Board of Education does not cover character of materials, strength of construction, safety loads of building, and other factors of safety which enter into school house construction and equipment. This responsibility is assumed by the local school board and the architect.

2. The State Board of Education may withhold approval of any plan which has not been drawn up in accordance with modern building practice and which does not insure safety of construction.

3. *"Full Approval"* by the State Board of Education, does not cover *"Factors of Safety"* unless stated in the letter of approval.

Publishers' Note—The foregoing Rules and Regulations in Regard to School House Construction are in process of revision but, unfortunately, the revised specifications could not be included in this book. It is suggested that application be made to the State Board of Education, Bureau of School Buildings, Harrisburg, Pa., for a copy of the revised rules.

GENERAL RULES AND REQUIREMENTS

of

THE PHILADELPHIA ELECTRIC COMPANY

DELAWARE COUNTY ELECTRIC COMPANY

RELATIVE TO ELECTRIC SERVICE, METERS, WIRING, MOTORS, Etc.

Second Edition

Effective Jan. 1, 1923

Copies of these Rules may be obtained from any of the Offices of the Company

SPECIAL NOTICE

These rules as printed have been revised to conform to present practice and differ slightly from the original edition as printed in January 1, 1923. Further revisions may be made from time to time.

Detail information concerning service and metering equipment is contained in printed supplements issued from time to time, and may be obtained on application from the Inspection Section of these Companies at the N. W. cor. 23rd and Market Sts., Philadelphia, Pa.

IMPORTANT

The attention of electrical contractors is called to the following suggestions, the observance of which will facilitate the introduction of electricity.

1. Advise your customer to call at the DISTRICT OFFICE of the Company, or telephone for a representative, and sign the necessary application or contract immediately (if he has not already done so). See Article 1, Sections 1 and 4.

2. Apply for the service and meter location at once, in order that the information may be available when you are ready to start work. See Article 7, Section 8.

3. Install the service conduit and wires, the neutral service ground wire, the service switch and service entrance cabinet *first*, in order that the Company may be able to install the meter and complete the necessary connections by the time the installation is ready for use. See Article 7, Sections 12, 16, 22 and 27; Article 8, Section 2; Article 9, Sections 10 or 18.

4. Make application to the Underwriters' inspection authorities for the necessary inspection. Remember that electricity cannot be introduced until the Underwriters' certificate is issued. See Article 5, Sections 1 and 6.

5. Leave your name, address and telephone number on the premises, preferably on a tag attached to the service switch, for the information of the Inspector in case it is necessary for him to get in touch with you.

6. Do not hesitate to freely consult the Company's inspector relative to the character of metering equipment to be furnished for the installation, the necessary service devices you must provide, their location, and the proper method of terminating and connecting the service and house wires, etc.

7. The Inspection Division of the Meter and Installation Department is located in the Company's Central Service Building, N. W. corner of 23d and Market Sts. Bell and Keystone telephone service is available.

INTRODUCTION

The object of this book is to present, in a complete and concise form, general rules and requirements relative to the introduction, distribution and use of electricity supplied from the Company's lines. This should not be considered as a complete book of rules governing the installation of electric wiring or other apparatus, but covers those points regarding these matters in which customers, architects, engineers, electrical contractors and the Company are mutually interested, and the knowledge of which will serve to prevent unnecessary delays in the furnishing of electricity.

Nothing herein contained shall be considered as conflicting with or superseding the Standard Terms and Conditions in the Company's "Tariff of Rates."

In this edition, the subject matter has been revised and the requirements included in "Supplement No. 1 of the General Rules and Requirements," effective April 18th, 1921, have been incorporated.

Special conditions may arise which would be impracticable to cover in a book of this character, and, in such cases, the Company will be pleased to give individual attention upon request.

The Inspectors of the Company will see that these requirements are complied with and are instructed to render the customer every possible assistance in this connection.

Supplements to these rules may be issued from time to time. Contractors and others interested should see that their names are on the mailing list of the Company.

ARTICLE 1

HOW TO OBTAIN SERVICE

1. Any person, partnership or corporation whose premises are adjacent to the Company's lines may obtain service by first signing an application or such a contract and agreement as may cover the special circumstances of the case, on the regular form used by the Company for the particular class of service desired, and by making such advance payment or cash deposit as may be required by the Company.

2. When it is necessary for the Company to create service facilities in addition to those already existing, in order to reach the premises to be served, the Company will determine, from the circumstances surrounding the application for service, to what amount the said facilities shall be financed by the customer and by the Company.

3. Information concerning rates and contracts may be secured, applications for electricity made and contracts signed at any of the offices of the Company, or, a representative of the Company will call upon request.

4. Applications or contracts for either original or additional installations must be signed and duly accepted by the Company before service or meter installation orders will be issued.

5. The Company does not install electric light or power wiring on the premises of customers or prospective customers. Where such premises are not electrically equipped, or changes in wiring or equipment are desired, a contractor should be employed.

6. Customers and prospective customers are advised to employ only experienced and reliable electrical contractors, to acquaint themselves with the general requirements contained in this book, and to avail themselves of the knowledge and experience of the Company, which is always at their disposal.

7. The Company is prepared to furnish advice, information and data regarding any proposed methods of installation or any apparatus to be connected to its lines.

ARTICLE 2

LIST OF DISTRICTS AND OFFICES

The territory served by the Company is divided into districts, each having a local commercial office. All information pertaining to the character of service available, installation or removal of service, connection of additional load, purchase or renewal of lamps, rates and bills should be obtained from the office of the district. Districts and offices are as follows:

THE PHILADELPHIA ELECTRIC COMPANY

General Offices: Tenth and Chestnut Streets.

District "A"—South Street and all that portion of the city south thereof between the Delaware and Schuylkill Rivers.

District Office—Broad and Wharton Streets.

District "B"—North from South Street and south of Girard Avenue and Shackamaxon Street, from the Schuylkill River to the Delaware River, not including any portion of South Street, Girard Avenue or Shackamaxon Street.

District Office—Tenth and Chestnut Streets.

District "C"—North from Girard Avenue and Shackamaxon Street to Lehigh Avenue, and from and including the east side of Broad Street to the Delaware River, including both sides of Girard Avenue and Shackamaxon Street and the south side of Lehigh Avenue.

District Office—Sixth Street and Susquehanna Avenue.

District "DK"—From and including the east side of Broad Street to the Delaware River; northeast from the north side of Lehigh Avenue to the south side of Butler Street to Front Street; to the Pennsylvania Railroad; to Kensington Avenue; to Butler Street; to Frankford Avenue; to Butler Street; to the Delaware River.

District Office—Kensington Avenue and Clearfield Streets.

District "DF"—Using centers of streets as dividing lines, Butler Street from Broad Street to Front Street; to the Pennsylvania Railroad; to Kensington Avenue; to Butler Street; to Frankford Avenue; to Butler Street; to the Delaware River. Extending to the north to Roosevelt Boulevard from Broad Street to the Philadelphia, Newtown, and New York Railroad; to Cottman Street; to Church Road; to Fox Chase Road; to Cedar Road; to Jenkintown Road; to Shady Lane; to County Line; to Poquessing Creek; to the Delaware River; and from and including the east side of Broad Street to the Delaware River.

District Office—Frankford Avenue and Orthodox Street.

District "E"—North from Girard Avenue, including both sides of Girard Avenue and the southern boundaries of Girard College, to and including both sides of New Hunting Park Avenue from Broad Street to Wissahickon Avenue; thence on Wissahickon Avenue to Rittenhouse Street but not including Wissahicken Avenue; Rittenhouse Street to Wissahickon Creek; to County line; to the Schuylkill River; west from and including the west side of Broad Street to the Schuylkill River.

District Office—Eighteenth Street and Columbia Avenue.

District "F"—West of the Schuylkill River to the limits of Philadelphia County.

District Office—40th and Ludlow Streets.

District "G"—West from and including the west side of Broad Street to the City Line; Cheltenham Avenue from Broad Street to the Pennsylvania Railroad to Laverock Station; thence direct to Paper Mill Road at Cheltenham Avenue; then to Stenton Avenue; to Wissahickon Avenue as far as Reading Pike; thence to Wissahickon Creek to Rittenhouse Street; to Wissahickon Avenue, including both sides of Wissahickon Avenue; to New Hunting Park Avenue; to Broad Street, not including Hunting Park Avenue.

District Office—41 W. Chelten Avenue.

Branch Office—Broad and Ruscomb Streets.

District "H"—Roosevelt Boulevard from Broad Street to the Philadelphia, Newtown and New York Railroad to Cottman Street; to Church Road; to Fox Chase Road; to Cedar Road; to Cottman Street; to Forrest Avenue; not including either side of Cottman Street; from Cottman Street and Forrest Avenue to Old York Road; to Spring Avenue; to Cheltenham Avenue; to Washington Lane; to Cheltenham Avenue or City Line; to Broad Street; to Roosevelt Boulevard.

District Office—41 W. Chelten Avenue.

Branch Office—Broad and Ruscomb Streets.

District "B and M"—Between the Delaware County line and the Schuylkill River, northwest from City Line Avenue to the limits of the territory served by the lines of The Philadelphia Electric Company.

District Office—40th and Ludlow Streets.

Branch Office—Tregarron Road and Montgomery Avenue, Cynwyd, Pa.

DELAWARE COUNTY ELECTRIC COMPANY

General Offices—Tenth and Chestnut Streets.

District "Chester"—North from that portion of the Delaware River between the Delaware State Line and Darby Creek. East from the Delaware State line to a line starting at Darby Creek; thence to Burk Avenue; to the Philadelphia Division, Baltimore & Ohio Railroad; to Garfield Street; to Lincoln Street; to Van Buren Street (Ridley Township); to Crum Creek; to Chester Road; to Providence Road; to Ridley Creek; to Main Street (Upland Borough); to Upland Borough line; to Chester Creek; to Upland Road; to the Baltimore & Ohio Railroad; to Upper Chichester Borough line; to Bethel Borough line; to the Delaware State line.

District Office—16-18 E. 5th Street, Chester.

District "Media"—East from the Delaware State line and Brandywine Creek to Crum Creek; and North from district "Chester" to the limits of the territory served by the lines of the Delaware County Electric Company.

District Office—29 W. State Street, Media.

District "Lansdowne"—West from the Philadelphia City Line to a line starting at Darby Creek; thence to Burk Avenue; to the Phila-

delphia Division, Baltimore & Ohio Railroad; to Garfield Street; to Lincoln Street; to Van Buren Street (Ridley Township); to Crum Creek; thence north along Crum Creek and north from the Delaware River to the limits of the territory served by the lines of the Delaware County Electric Company.

District Office—9 South Lansdowne Avenue, Lansdowne.

ARTICLE 3
GENERAL INFORMATION

1. Electricity sold is measured by meter, with the exception of that used for series incandescent and series arc lamps.

2. The Company will keep in repair and maintain its own property installed on the premises of the customer, provided, however, that if its property is damaged by the customer or by his employees the cost of repairs shall be paid by the customer.

3. Offices of the Service Maintenance Department for receipt of service complaints are located as follows:

At Tenth and Chestnut Streets, Philadelphia, for customers of The Philadelphia Electric Company.

At Bala and Highland Avenues, Bala, for customers of "B and M" District.

At Ridge and Beach Streets, Morton, for customers of the Delaware County Electric Company (outside of Chester).

At 16-18 E. 5th Street, Chester, for customers of the Delaware County Electric Company (in Chester).

Employees are on duty day and night. Reference should be made in all cases to the telephone directory for the proper telephone number.

4. All employees of the Company are strictly forbidden to demand or accept from the customer or contractor any gratuities or personal compensation for services rendered.

5. The Company, under the terms of its contract, acquires the right to enter upon the premises of the customer at all reasonable times for the purpose of testing, inspecting, repairing, removing or exchanging any or all appliances belonging to the Company and used in connection with its service and for the purpose of removing its property on the termination of the contract or on the discontinuance of the service.

6. All employees requiring access to the premises of the customer are furnished with standard badges identifying them as employees of the Company. Customers should insist upon employees exhibiting this badge and should refuse to permit any representative of the Company to enter their premises unless so provided.

ARTICLE 4
CHARACTER OF SERVICE AVAILABLE

In making application for service, inquiry must always be made as to the character of service available in the particular location in question and as to whether it is overhead or underground (See "Services," Article 7, Section 8). Service furnished by the Company is classified as follows:

1. Direct current, Edison three-wire system, underground, nominally 115 and 230 volts (available under certain conditions only in that section of the City of Philadelphia, approximately between Pine Street and Vine Street, from the Delaware River to 24th Street).

2. Alternating current, underground and overhead, 60 cycles, single and two phase, nominally 115 and 230 volts (available outside of the limits noted in Section 1 and also under certain conditions within those limits).

3. Alternating current, 60 cycles, two phase, nominally 2300 volts.
4. Alternating current, 60 cycles, three phase, nominally 13,200 volts.
5. Series incandescent system.
6. Series arc system.

ARTICLE 5

ELECTRICAL INSPECTIONS AND INTRODUCTION OF ELECTRICITY

1. Fire Underwriters' Inspection—All wiring and apparatus to be connected to the lines of the Company must be installed in accordance with the rules and requirements of, and be inspected by the Philadelphia Fire Underwriters' Association, Philadelphia Suburban Fire Underwriters' Association or the Associated Factory Mutual Fire Insurance Companies. Certificates will be issued, in the city of Philadelphia, by the Philadelphia Fire Underwriters' Association and, outside of the City limits, by the Philadelphia Suburban Underwriters' Association. Contractors or others installing the wiring must make application for this inspection to the association having jurisdiction.

Attention is called to the following conditions under which these certificates are issued:

No additions, alterations or repairs shall be made in the system of wires, lamps or any portion of the system of wires or appliances for conducting, creating or controlling the electric current located in the building, until written notice has been given to the Association, and an additional permit granted.

The Inspectors of the Association shall have the privilege of inspecting and examining, at any time, the system approved and the Association shall have the right to cancel the certificate, on giving written notice, if the licensee receiving the certificate fails to comply with its conditions.

The certificate is to be presented to the insurance companies insuring the property, for indorsement on policies.

2. City Inspection—Plans and specifications covering the installation of wiring and apparatus, either new work or alterations, in theatres and motion picture houses within the City of Philadelphia must be approved by the Electrical Bureau of the Department of Public Safety of the City of Philadelphia and the installation is subject to its inspection.

3. Company's Inspection—For the purpose of providing proper service, the Company insists upon inspecting all installations before electricity is introduced and reserves the right to reject any wiring or appliances not in accordance with its rules, but the Company will not, in any case whatever, assume any responsibility or loss for violations of its rules, or for defects which may develop in any part of the installation, or for accidents which may occur upon the premises of the customer.

4. Installations appearing to be defective, or not in accordance with the requirements of the Company, will be reported to the contractor by whom the work is installed and, if necessary, to the customer.

5. Inspectors of the Company are instructed to render the Inspectors of the Underwriters' Associations and of the City every assistance possible, in order that installations shall conform to any rules in effect at the time of installation.

6. Introduction of Electricity—Electricity will not be introduced until the wiring and appliances are approved by the inspection authorities having jurisdiction, and the installation is also in accordance with the rules and requirements of the Company. The introduction of electricity is effected by the initial placing of the service fuses, or the initial

closing of the circuit breaker where such a breaker is installed instead of service fuses. The initial placing of such fuses or closing of the breaker, or the increasing of service fuses for additional loads, will always be done by an authorized representative of the Company. Customers and contractors must not perform these operations under any circumstances.

7. The customer, in his contract with the Company, agrees that no appliances or apparatus other than of the original installation shall be connected to the wires of the Company or of the customer, without the consent of the Company. A breach of this agreement shall make the customer liable for any damage to the meters and their auxiliary apparatus or the transformers or wires of the Company caused by the connection of such additional devices.

8. The Philadelphia Fire Underwriters' Association and the Philadelphia Suburban Underwriters' Association have made the ruling that, in the event of service having been discontinued in a building for one month or more, a reinspection must be made, the rules of the Associations enforced and a certificate issued before electricity is reintroduced.

ARTICLE 6

Systems of Customers' Wiring

APPLICABLE TO BOTH DIRECT AND ALTERNATING CURRENT

1. Lighting installations in residences and apartments, not exceeding a connected load of 3300 watts and not exceeding two circuits, should be two wire, 115 volts, except where such installations include heating or cooking appliances exceeding 2000 watts or 230 volt motors, in which case they must be three wire, 115-230 volts, and the 115 volt circuits balanced as closely as practicable.

2. Lighting installations in residences and apartments, exceeding 3300 watts or exceeding two circuits, must be balanced on three wires, 115-230 volts.

3. Lighting installations other than in residences and apartments, not exceeding one circuit, should be two wire, 115 volts.

4. Lighting installations other than in residences and apartments, exceeding one circuit, must be three wire, 115-230 volts. (See Section 13 for exception applicable to large alternating current installations.)

Note—Lighting installations of two wire, 230 volts are not recommended by the Company.

5. One or more motors may be included in a lighting installation and connected to the lighting meter, provided that the individual capacity of the motors does not exceed one half horsepower. (See "Motors," Article 14, for requirements relative to motor starting currents, voltage, etc.)

6. Separate mains must be run to the meter location for light and power, except as modified in Section 5.

7. Lamps must not be connected to a motor or other power installation, except where specifically permitted by the contract.

8. Rules relative to the wiring for and use of various appliances and apparatus will be found in other articles in this book. (See "Motors," Article 14, "Electric Signs," Article 16, "Electric Heating Appliances," Article 17, etc.)

9. Where the use of electricity is intermittent or subject to violent fluctuation, as for hoists, elevators, welding machines, electric furnaces,

etc., the Company reserves the right to require the customer to provide, at his own expense, suitable equipment to reasonably limit such intermittance or fluctuation.

10. Wiring inclosed in metal conduits, or other metal raceways, must have all of the wires of a circuit or main installed in the same conduit, except that where four-wire mains or circuits are installed for two phase supply, the wires of each phase may, if preferred, be installed in separate conduits.

11. It is recommended that the wiring be so arranged that the drop in voltage from the point of entrance of the service to the farthest lamp, with the entire load in use, will not exceed 1½%.

APPLICABLE TO DIRECT CURRENT

12. Motor installations must be two wire, except installations including both 115 and 230 volt motors, or 115 volt motor installations exceeding one circuit or an aggregate capacity of three-quarters horsepower, which must be three wire, 115-230 volts.

APPLICABLE TO ALTERNATING CURRENT

13. Alternating current lighting installations exceeding a connected load of 50 kilowatts must be five wire, *i. e.*, two three wire mains or a five wire main must be run to the meter location.

14. Single phase motor installations must be two wire, except installations in which both 115 and 230 volt motors are included, or 115 volt motor installations exceeding one circuit or an aggregate capacity of three-quarters horsepower, which must be three wire. (See also "Motors," Article 14, Section 18 for further exception.)

15. Two phase, 230 volt motor installations must be wired four wire between the motors and the meter.

16. Two phase, 2300 volt motor installations must be wired three wire between the motors and the meter.

17. Where an installation includes more than one class of power equipment, such as motors, moving picture apparatus, X-ray apparatus, welding equipment, furnaces or any combination of the above, separate service wires and separate meters may be required for each class or equipment, depending upon the nature of the contract entered into for the supply of electricity, in which case separate mains must be run to the meter location for each class of equipment thus separately metered. Before installing the wiring for combination power loads, information must be obtained from the Company as to the method of metering and the number of mains necessary.

ARTICLE 7

Service Construction

GENERAL INFORMATION

1. The rules and information included in this article apply to service construction for 115 or 230 volts. For information relative to 2300 volt or 13,200 volt services, see Article 10.

2. Installations of large capacity may require transforming equipment to be located on the customer's premises, in which case the customer will provide the necessary space and erect the necessary structures such as transformer vaults, switch houses, and protective screens, which work shall be done in accordance with plans and specifications

furnished or approved by the Company for each case. (See "Service Installations of 2300 Volts and Over," Article 10.)

3. Service Construction—The service construction includes the wires and other material which comprise the entire connection between the Company's street lines, either aerial or underground, and the meter location on the customer's premises.

4. Company's Service Construction—The Company's service construction from the underground system is, in general, the construction from the street mains of the Company to a point just inside the customer's property or building line, subject to the conditions noted in Sections 10 and 11. The Company's service construction from the overhead system is, in general, the construction from the pole line to the service bracket mounted on the building, subject to the conditions noted in Sections 13 and 14.

5. Customer's Service Construction—The customer's service construction includes the wires and enclosing conduit from the bracket of an overhead service to the service switch or service entrance cabinet.

6. Service Extension—A service extension includes the wires and enclosing conduit between the service switch and the meter location.

7. Number of Services—Unless otherwise provided for by contract with the Company, a Company's service will be introduced to only one point for each building, or group of buildings under one contract.

Where contracts do provide for the introduction of more than one service, such as for theatres, moving picture houses, or for fire pumps, the Company must be consulted relative to the service and meter installation and the system of wiring before the work is started.

8. Service Location—A service from the Company's overhead system is usually introduced to the premises overhead, and a service from the underground system is introduced underground, but a service from the overhead system may be extended from an aerial line pole and introduced to the premises underground, if arrangements are made with the Company.

It is essential, in order to avoid error, that information be obtained as to the point at which the service is to be terminated in or on the building, before any electrical work is started.

In order to assist the contractor in securing such information, a special form has been provided (Application for Location of Service and Meter) which can be secured upon request at any office of the Company. On receipt of this form properly filled in, the Company will determine the location of the meter, the character of the service which will be supplied, the number of service wires, and, if overhead, the point at which the customer's conduit should be terminated on the building, or, if underground, the termination of the Company's service. This information will be furnished, in writing, to the contractor or others applying for it.

Note—The Company will not be responsible for mistakes resulting from information relative to the character or location of its service obtained in any way other than the above.

9. Number of Service Wires—The number of wires required in the customer's service construction and service extension:

a. For lighting installations in residences or apartment houses.

Alternating or direct current, not exceeding a connected load of 3300 watts, and not exceeding two circuits, 2 wires.

Note—Where a residence or apartment lighting installation includes heating or cooking appliances exceeding 2000 watts, or 230 volt motors, 3 wires must be installed.

Direct current, exceeding 3000 watts, or exceeding two circuits, or including two or more apartments separately metered, 3 wires.

Alternating current exceeding 3300 watts or exceeding two circuits, or including two or more apartments separately metered, but not exceeding a connected load of 50 kw., 3 wires.

Alternating current, exceeding a connected load of 50 kw., 5 wires.

b. For lighting installations in other than residences or apartment houses.

Alternating or direct current, not exceeding one circuit, 2 wires.

Direct current, exceeding one circuit, 3 wires.

Alternating current, exceeding one circuit, but not exceeding a connected load of 50 kilowatts, 3 wires.

Alternating current, exceeding a connected load of 50 kilowatts, 5 wires.

c. For power installations.

Alternating or direct current, 115 volt motors, or other 115 volt apparatus, not exceeding one circuit or not exceeding an aggregate of three-quarters horsepower, 2 wires.

Alternating or direct current, 115 volt motors, or other 115 volt apparatus, exceeding one circuit or exceeding an aggregate of three-quarters horsepower, 3 wires.

Direct current, 230 volt motors or other 230 volt apparatus, 2 wires.

Single phase, alternating current, 230 volt motors or other 230 volt apparatus, 3 wires.

Note—Where a power installation of single phase alternating current 230 volt motors exceeds an aggregate connected load of 25 horsepower, 5 wires must be installed.

Two phase alternating current, 230 volt motors or other 230 volt apparatus, 5 wires.

One of the wires specified above for a single phase or two phase alternating current power installation is required for grounding purposes and must be installed in accordance with the requirement noted in "Grounding of Secondary Alternating Current Services," Article 8..

Separate service wires may be introduced by the Company for alternating current power equipment of different classes, such as motors, moving picture equipment, X-ray apparatus, welders, furnaces, etc., in which case separate wires for each class must be installed by the contractor in the customer's service and service extension. Information as to the number of wires which the Company will introduce for an installation including more than one of the above classes of equipment (See Section 8) must always be obtained for each particular case.

Separate service wires will be required for alternating current light and power installations, except that if a customer's installation includes more than one class of equipment, such as lamps, motors and X-ray apparatus, the requirements as to the number of wires may be modified by the installation of only one neutral wire for all classes of equipment supplied, provided that this neutral wire is installed in accordance with the requirements noted under "Grounding of Secondary Alternating Current Services," Article 8, Sec. 9.

UNDERGROUND SERVICES

10. Where the lines of the Company are underground, the Company's service construction will be introduced into the cellar or basement, where the building is located on the property line, and will be terminated just inside the building wall. Where the building is not located on the property line, the Company's service construction will terminate

at the property line. If a vault exists beyond the property line and the Company's service enters the vault, the Company will extend its service construction in conduit to the property line, unless a suitable meter location is available in the vault.

11. Where a customer's building is at such a distance from the property line that additional underground service construction on his premises is necessary, such construction may be installed by the customer, in accordance with specifications furnished or approved by the Company, and under the Company's supervision. In this case the Company's service construction will terminate just inside the property line. If the customer desires, all of the service construction up to the service location in the building will be installed by the Company, in which case the charge to the customer for the construction on his premises will be determined by the contract entered into for the supply of electricity.

12. The customer must install the necessary wiring between the service location and the service switch (See Section 22) or the service entrance cabinet. (See "Meters," Article 9, Section 10.) No wires smaller than No. 10 B. & S. gauge may be used and they must be enclosed in rigid or flexible iron conduit. The conduit must be properly terminated and the wire connections made at the service switch or service entrance cabinet and the conduit and wires must be long enough to reach and be readily connected to the service terminal. The Company will make the final connections at the service terminal.

OVERHEAD SERVICES

13. Where the lines of the Company are overhead, the Company will install the service construction from its pole to the service bracket attached to the building of the customer, except as noted in Section 14.

14. Where the customer's building is at such a distance from the highway that additional construction on his premises is necessary, such construction may be installed by the customer in accordance with specifications furnished or approved by the Company. In this case the Company's service construction will terminate on the first pole inside the property line. The connection between the Company's service wires and the customer's service wires on the first pole will be made by the Company. If the customer so desires, all the construction up to the bracket on the customer's building will be installed by the Company, in which case the charge to the customer for the construction on his premises will be determined by the contract entered into for the supply of electricity.

15. The service bracket will ordinarily be secured to the wall of the building between the second and third floors. If the building is of two stories or less, the bracket will be secured to the wall as close to the cornice as practicable, or a support must be provided by the customer, as directed and approved by the Company, in order to provide sufficient clearance between the Company's wires and other structures and the highway.

16. Customer's services must be installed in continuous rigid iron conduits by the customer, from a point above the service bracket to the service switch or service entrance cabinet. In certain installations requiring large service conductors, where conditions are favorable, permission may be obtained from the Inspection Division to omit the conduit.

17. The customer's service must be run down the outside of the building, except that, where the wall is of brick, stone or concrete, the conduit may, if desired, be enclosed in the wall, provided, however, that the conduit be continuous from end to end.

18. Where the Company's service is installed to feed more than one building, separate service conduits must be run for each building, if occupied by separate customers. In manufacturing or other buildings in which the floors are rented separately, the customer's services may be extended from the bracket to the particular floors to be supplied, in the manner described in Sections 16 and 17.

19. The conduit installed for a customer's service must be provided at the service bracket end with an approved fitting to prevent the entrance of water. No wires smaller than No. 10 B. & S. gauge may be used and sufficient wire (not less than two feet) must be left extending beyond the fitting for connection to the Company's service. The conduit must be properly terminated and the wire connections made, at the service switch (See Section 22) or the service entrance cabinet. (See "Meters," Article 9, Section 10.) The Company will always make the final connections at the service bracket.

20. The Fire Underwriters' Inspection authorities require that the metallic connection must be broken between the customer's service conduit and house conduits. If the meter is located at some point other than at the service entrance the conduit connection must be broken at the service switch by the use of an insulated coupling or similar device. Where the meter is located at the point at which the service enters the building, this break may be effected as stated above, or by terminating the house conduit outside of the service entrance cabinet or the meter cutout enclosure, and introducing the house wires in flexible tubing or porcelain bushings.

21. No wires other than those specified in Section 9 will be permitted in the customer's service conduit. Where service wires for different classes of equipment are run from the same service bracket to the same meter location, they should preferably be installed in one conduit.

SERVICE SWITCHES AND SERVICE EXTENSIONS

22. On all services, the customer must furnish and install a fused service switch of an enclosed type approved by the Company, having sufficient current carrying capacity for the total connected load. Service switches must be mounted in an accessible position immediately at the point at which the service enters the building and must be provided with fuses of the proper capacity.

23. In a residence or apartment house in which service entrance cabinets are installed, an additional service switch will not be required, except where the meter is not located immediately at the point at which the service enters the building, or where there are more than four meters to be installed.

24. Separate service switches will be required for each class of equipment for which separate service wires are installed (See Section 9). Installations of large capacity, or where two or more services are connected in parallel, may require special service equipment, such as circuit breakers, feeder panels. Information as to the character of such service equipment which must be furnished by the customer for any particular installation, and the necessary space required, should be ascertained from the Inspection Division of the Company before wiring is started.

25. Where service wires are installed to feed more than one customer, the service switch must be of sufficient current carrying capacity for the total load which may be connected. Should special conditions seem to warrant an exception to this rule or its modification, the case should be referred to the Inspection Division of the Company.

26. Information relative to types of service switches and circuit breakers which are approved by the Company may be obtained from the Inspection Division.

27. The customer must install the necessary service extension between the service switch and the meter cutout or service entrance cabinet. No wires smaller than No. 10 B. & S. gauge may be used and they must be inclosed in rigid or flexible iron conduit. Where meters are located on separately rented floors of a manufacturing or other building (See "Meters," Article 9, Section 3), and an underground service is installed, service extensions must be run to the meter locations on the different floors. The Inspection Division should be consulted relative to the method of installing such extensions.

ARTICLE 8

GROUNDING OF SECONDARY ALTERNATING CURRENT SERVICES

ARTICLE 9

Meters

GENERAL

1. The meters or other measuring devices necessary under the contract will be furnished and installed by the Company and will always remain the property of the Company. If additional meters, other than those required under the contract, are installed by the Company at the request of and for the convenience of the customer, a monthly rental charge will be made.

2. A suitable location, approved by the Company, must be provided by the customer for the erection of the meter or meters. On new installations, this location will be determined at the same time and in the same manner as the location of the service (See "Service Construction," Article 7, Section 8).

3. All meters will be installed in cellars, with the following exceptions:

a. Buildings which were wired prior to the original issuance of these rules in 1907 and have meter loops left in other locations.

b. Buildings which have no cellars, in which case the meters may be installed on the first floor.

c. Buildings in which the various floors are rented separately, in which case the meters should, preferably, be installed in the cellar but may be installed on the particular floor to which the electricity is supplied.

d. Office buildings and apartment houses requiring separate meters for each office or suite, in which case the meters for each floor may be installed in one group in an accessible location on that floor.

4. Under no circumstances will meters be installed in bathrooms, bedrooms, living rooms, kitchens, bulk windows, over doors, washtubs, or basins, or in other locations likely to cause the visits of the meter reader or tester to be of annoyance or trouble to the customer.

Meters will not be erected on partitions or other supports liable to excessive vibration, nor in locations subject to moisture or extremes of temperature, nor where damage to the meter is liable to result. Meters will not be erected on switchboards or panel boards of cus-

tomers, nor will the Company extend its meter supports to provide for the installation of customer's switches or other apparatus.

5. Meters will be erected at, or as near as possible to, the point of entrance of the service into the building and at a height of approximately five feet from the floor. It is to the interest of the customer, as well as of the Company, that the meter should be in a convenient location and accessible at all times.

6. Where meter closets are built they must be of sufficient size to allow easy access to, or removal of, the meter and its auxiliaries. The required dimensions of meter closets for any particular installation should be secured from the Inspection Division.

7. The standard types of meters used by the Company are front connected. Back connected meters will not be furnished.

8. Customers and contractors must notify the Company in the event of any alterations involving a change in location of, or connections to, the meter, which change must always be made by the Company at the customer's expense.

9. Service cutouts, service switches and meters are sealed. The breaking of these seals by other than authorized Company representatives or the tampering with the meters, cutouts, wires or any property of the Company is prohibited by law. Attention is called to the "Act of Legislature" bearing on this matter. (See Article 21.)

RESIDENCE AND APARTMENT INSTALLATIONS

10. A service entrance cabinet of a type approved by the Company must be furnished and installed at the meter location by the customer or owner.

11. Information as to the type of service entrance cabinets which are approved by the Company for use on alternating or direct current installations may be obtained from the Inspection Division.

12. As the type of meter to be used cannot always be determined by the Company in advance, the adapter furnished with the service entrance cabinet will be changed by the Company, when necessary, to fit the particular type of meter installed.

13. The service entrance cabinet must be rigidly erected, expansion bolts or lag screws being used for stone, brick or concrete walls, and wood screws of sufficient size if the cabinet is mounted on a wooden support. The cabinet must be mounted level and plumb.

14. The wire connections to both the service and house terminals of the service entrance cabinet will be made by the contractor. A diagram of connections will accompany each device. The wire connections between the service entrance cabinet and the meter will be made by the Company.

15. With each service entrance cabinet two standard plug fuses must be furnished and left in the box, to be put in place by the Company when current is introduced. The capacity of these fuses may be the maximum permitted by the National Electrical Code rating for the size of wire used between the service entrance cabinet and the house distribution center, but must not exceed 25 amperes unless the service wires between the overhead service bracket, or underground service head, and the service entrance cabinet are larger than No. 10 B. & S. gauge.

Where the installation is such as to require fuses in excess of 30 amperes, fuses of the proper capacity and type for the service entrance cabinet used and the size of the installation must be furnished.

Replacement of fuses in the cabinet may be made by the customer without breaking the seal, the design of the device being such that the cut-out is dead when the fuses are exposed.

16. The National Electrical Code requires a double pole cutout on each circuit of 15 amperes or less and therefore all installations in excess of 15 amperes will have separate house cutouts, in addition to the service entrance cabinet.

On installations of only one circuit of 15 amperes or less, a two-pole cutout must be installed on the house side of the meter, in addition to the service entrance cabinet.

INSTALLATIONS OTHER THAN RESIDENCES AND APARTMENTS

17. The meter auxiliaries and support will be furnished and installed by the Company. The fuses in the meter cutouts will be furnished and installed by the Company.

18. The customer will terminate his house wiring in the meter cut-out inclosure or equivalent device furnished by the Company. The Company will make the final connections to the meter.

19. The character of the metering equipment furnished by the Company is dependent upon the nature of the contract entered into for the supply of electricity, and is also subject to changes in types of metering equipment used, therefore sketches or descriptions are not included in this book. Detailed information as to the equipment to be furnished for any particular installation, including requirements as to space and arrangement, may be secured from the Inspection Division.

ARTICLE 10

SERVICE INSTALLATIONS OF 2300 VOLTS AND OVER

1. Service for 2300 volts, two phase, or 13,200 volts, three phase, may be extended from underground or aerial lines, depending upon the nature of the Company's distribution system, but will be introduced into the customer's premises underground, except where the engineering features are such that, in the opinion of the Company, it is advisable to introduce it overhead.

2. Service for 2300 volts, two phase, or 13,200 volts, three phase, will be three wire. The location and character of the service construction and the metering equipment will be determined by the Company for each individual installation. The physical and electrical conditions surrounding such service installations preclude the application of general rules covering all cases.

3. Where service for 2300 volts or over is introduced, necessary disconnecting devices and accessories, together with, in most cases, transforming equipment, must be installed on the customer's premises. Transformers, if located in buildings, must be installed in fireproof rooms or vaults, but may, if conditions are suitable, be located outside of the building.

4. The customer must provide the necessary space and erect the necessary structures, such as transformer vaults, switch houses and protective screens, the location and size of which will be determined by the Company. The electrical construction from the Company's lines to the meters and transformers will be installed by the Company, or, if the customer desires, he may install that portion of the work on his premises. The charge to the customer for electrical construction done by the Company in connection with such an installation will be determined by the contract entered into for the supply of electricity.

5. All work done by the customer in connection with such an installation must be performed in accordance with plans and specifications furnished or approved by the Company, and under the Company's supervision, and must conform to the rules of the Fire Underwriters' Association having jurisdiction.

6. Vaults and inclosures must be equipped with hasps, for which the Company will supply standard padlocks with keys. Such inclosures should be kept locked and only competent persons allowed access to them. Inspectors and representatives of the Company must be permitted access to the equipment at all reasonable times for the purpose of inspection or operation.

7. Changes or alterations in the equipment must not be made by the customer without prior notification to and approval by the Company.

8. Vaults and inclosures containing equipment of 2300 volts or over must not be used for other purposes, such as the storage of material. Doors and passages must be accessible at all times. Safety appliances specified by the Company, such as rubber gloves and mats, must be furnished and maintained in good condition by the customer, must be available for use when necessary, and must not be removed from the premises.

9. Persons contemplating the erection of buildings in which service of 2300 volts or over is to be supplied are requested to consult with the Company as to the necessary space and structures for the equipment, so that proper provision may be made in the original design and construction of the building.

ARTICLE 11

CONNECTIONS FOR EMERGENCY OR AUXILIARY SERVICE

1. A service supplied to an installation, which has also a private source of electrical supply, must be connected through a double-throw switch or switches so arranged that the Company's service and the private source of supply cannot be connected in parallel.

2. The above mentioned switch or switches shall not take the place of any service switch required at the point of entrance of the service into the building, and must be furnished and installed by the customer subject to the approval of the company.

3. Where service is supplied to an installation which has a private source of electrical supply, and the contracted demand from the Company is over 25 kilowatts, but is less than the maximum demand of the customer's installation as estimated by the Company, a suitable circuit breaker will be required. This circuit breaker shall be furnished and installed on the house side of the meter by the customer or by the Company at the customer's expense, and must be of a type approved by the Company. Its setting must be under the sole control and adjustment of the Company.

ARTICLE 12

INCANDESCENT LAMPS

1. The first installation of incandescent lamps must be paid for by the customer, and must be purchased from the Company in order to obtain renewals. Information as to the sizes and types of lamps, as well as their original purchase and renewal prices, may be obtained from any office of the Company.

2. All lamps furnished by the Company and used exclusively under a lighting contract will be exchanged at any office of the Company, if the filaments only are broken or the lamps are otherwise defective

(the glass remaining intact). Lamps of certain types and sizes will be exchanged, free of charge, and other lamps at a special renewal price.

3. Lamps used under a power contract are not subject to free renewal or special renewal prices.

4. Lamps of standard types furnished by the Company may be exchanged for larger or smaller standard lamps free or at the special renewal prices. Smaller lamps than those returned, or larger lamps up to 50 watts, will be furnished without reinspection of the wiring by the Company. Where exchanges are desired for lamps of larger size, the wiring may be subject to a reinspection before the lamps are furnished.

5. Lamps of sizes up to and including 250 watts may be used in standard sockets; lamps larger than 250 watts require the larger size Mogul sockets.

6. Incandescent lamps not larger than 1500 watts each may be 115 volts. If more than one 115 volt lamp larger than 500 watts is installed, they must be balanced on 3 wires, 115-230 volts.

ARTICLE 13

ARC LAMPS

1. The Company does not trim, repair or otherwise maintain arc lamps, except series lamps operated on the Company's own circuits.

2. Multiple arc lamps requiring 750 watts or less may be 115 or 230 volts.

3. Multiple arc lamps requiring over 750 watts each must be 230 volts.

Multiple arc lamps used for photographic purposes, etc., requiring over 750 watts each, may, however, be 115 volts if they are balanced in equal pairs on the three-wire system. Each pair of lamps should be so connected that both lamps will be used at the same time.

ARTICLE 14

Motors

GENERAL

1. The following regulations are necessary for the purpose of securing satisfactory service to all customers. The successful operation of motors and lighting apparatus requires that the normal voltage of the supply circuit be closely maintained. As voltage regulation is affected by the amount of current taken from the line, a motor exceeding the maximum permissible starting current will not be connected to the Company's lines, as its operation would prevent satisfactory service.

2. In order to determine the type of motor which may be used, the exact characteristics of the service which will be furnished to any installation (*i. e.*, direct or alternating current, voltage frequency and phase) must be ascertained in advance from the Company, by the prospective customer.

3. No motor will be accepted for connection to the Company's lines unless provided with a name plate showing the rating, in horsepower or amperes and volts; nor if such name plate has been altered in any way affecting the above data.

4. Motors for fire pumps must be installed in accordance with the special rules of the Fire Underwriters' Association governing such equipment.

5. Motor starting devices required by these rules must be so designed that on failure of voltage, either, (a) the motor will be discon-

nected from the line; or, (b) the starting device will be returned to the starting position.

6. By starting device is meant any device, either external to, or internal to a motor (or a combination of both) whereby the instantaneous current drawn from the line at starting is limited in value. Starting devices, when required, shall be so designed and adjusted that the instantaneous current drawn by the motor during the starting period shall not exceed the maximum limits set by the rules.

7. Tests have been made from time to time of various types of motors, and information as to whether such motors, with or without starters, are within the required limits of Sections 11 and 14, will be furnished on request.

Specifications and tests of new types of motors must be submitted to and be approved by the Company before the motor is permanently connected to the lines. All motors are subject to test by the Company at any time after being connected, and services may be discontinued where the starting current exceeds the permissible value.

8. Where an installation consists of a number of motors, the starting device may be omitted from any motor which, with the starting device omitted, would have a starting current less than the permissible maximum for the largest motor (other than a fire pump motor) in the installation.

9. Motor installations consisting of several 115 volt motors, exceeding one circuit, or exceeding an aggregate capacity of three-quarters horsepower, must be balanced on three wires, 115-230 volts.

10. Should special conditions seem to warrant an exception to these rules, as where 2300 or 13,200 service is supplied, the case must be referred to the Inspection Division for consideration and decision.

See also "Systems of Customer's Wiring," Article 6, Sections 5 to 17, for rules relative to wiring for motor installations.

DIRECT CURRENT MOTORS

11. The following are the maximum permissible starting currents for direct current motors. A starting device (See Section 6) will not be required with any motor, which, when connected to its load, does not exceed the starting current specified for a motor of that particular horsepower. If this value is exceeded, a starting device must be installed to limit the current to the permissible maximum. When an installation comprises more than one motor, see also Section 8.

115 VOLT MOTORS

½ horsepower and less	30 amperes

230 VOLT MOTORS

1 horsepower and less	12 amperes
Above 1 hp. to 3 hp., incl.	12 amperes per hp.
Above 3 horsepower	9 amperes per hp.

Note—Current values are those indicated by a suitable well damped ammeter on the line side of the starting device.

12. Motors of one half horsepower or less may be 115 or 230 volts.

13. Motors of over one half horsepower must be 230 volts.

60 CYCLE ALTERNATING CURRENT MOTORS

14. The following are the maximum permissible starting currents for alternating current motors. A starting device (See Section 6) will not be required with any motor which, when connected to its load, does not exceed the starting current specified for a motor of that particular horsepower. If this value is exceeded, a starting device must be installed to limit the current to the permissible maximum. When an installation comprises more than one motor, see also Section 8.

SINGLE PHASE, 115 VOLT MOTORS

½ horsepower and less	25 amperes.

SINGLE PHASE, 230 VOLT MOTORS

½ horsepower and less	15 amperes
Above ½ hp. to 1 hp., incl.	20 amperes
Above 1 hp. to 5 hp., incl.	15 amperes per hp.

TWO PHASE, 230 VOLT MOTORS

	Per Phase
1 horsepower and less	17.3 amperes.
Above 1 hp. to 2 hp., incl.	15.2 amperes per hp.
Above 2 hp. to 5 hp., incl.	11.2 amperes per hp.
Above 5 hp. to 30 hp., incl.	8 amperes per hp.
Above 30 horsepower	5.2 amperes per hp.

TWO PHASE, 2300 VOLT MOTORS

	Per Phase
Above 5 hp. to hp., incl.	1 ampere per hp.
Above 30 horsepower	0.5. amperes per hp.

Note—Current values are those indicated by a suitable well damped ammeter in the motor circuit on the line side of the starting device, and are approximately 75 per cent. of the permissible locked rotor values.

15. The maximum starting currents noted in Section 14 are such that the ordinary squirrel cage motor of over five horsepower will generally require a starting device. Instances may also occur in which a starting device will be required with motors of five horsepower or less. Customers and contractors purchasing and installing motors should ascertain their starting currents and must include starting devices where necessary.

16. Single phase motors of one half horsepower and less may be 115 or 230 volts.

17. Single phase motors of over one half horsepower must be 230 volts.

18. Single phase motors may be used in sizes up to and including five horsepower, provided that the aggregate capacity of such motors comprised in a single installation does not exceed twenty-five horsepower on a single phase service. Where a single installation of motors of five horsepower or less, but aggregating over twenty-five horsepower, is connected, two phase service will be supplied and either single or two phase motors may be used; but, if single phase, they must be balanced on the two phase service.

19. Two phase motors must be 230 volts, except that 2300 volt motors may be used in installations supplied by 2300 volt service, and

motors of any voltage may be used where the customer installs and maintains the necessary transforming equipment on his premises.

20. Two phase motors must be used in sizes above five horsepower, except where permission has been obtained from the Company for the use of larger single phase motors. Two phase motors in sizes up to and including five horsepower may also be used if the customer so desires and the Company has two phase power lines adjacent to the premises.

21. Three phase motors of 13,200 volts may be used where the Company's standard service of that voltage is supplied, or three phase motors of other voltages may be used where the customer furnishes and maintains the necessary transforming equipment.

22. The maintenance of a high power factor in a power installation is of importance to the customer as affecting the amount and cost of the electricity supplied. Underloaded alternating current motors contribute largely to the creation of low power factor conditions. Particular attention should, therefor, be given to the selection of motors of the proper types and sizes.

In the selection of motors customers should give preference to types which operate at high power factors. Synchronous motors are preferable where the size of the load and the operating conditions are suitable. Where conditions warrant their use, static condensers or other power factor correcting apparatus should be used in conjunction with induction motors.

ARTICLE 15

ELECTRIC ELEVATORS AND CRANES

1. Single phase motors must not be used for passenger or freight elevators, cranes, or other similar equipment intermittently used, where the frequent starting and stopping of the motor would interfere with the maintenance of satisfactory service to other customers.

2. Where reverse phase relays and circuit breakers, or equivalent devices, are required by the National Electrical Code, they must be of types approved by the Company.

3. Where more than one elevator or crane is connected to a common main, one reverse phase relay and circuit breaker, or equivalent device, may be installed to protect the entire installation in case of phase reversal, instead of individual protective equipment for each motor.

ARTICLE 16

ELECTRIC SIGNS

1. Sign wiring must be installed in accordance with the conditions specified under "Systems of Customer's Wiring," Article 6, except that a maximum of 1320 watts will be accepted on a 115 volt circuit.

2. Permits must be secured from the Electrical Bureau, Department of Public Safety, for the erection of all signs within the City of Philadelphia.

3. Attention is called to the fact that each sign erected must be covered by a certificate of the Fire Underwriters' Association having jurisdiction.

4. When the meter for an electric sign cannot be located within a building, the customer must furnish a double compartment weatherproof locked box approved by the Company, one compartment of which will contain the Company's meter, the other, the controlling apparatus for the sign. Each compartment must have a separate door so that it may be locked.

ARTICLE 17

ELECTRIC HEATING APPLIANCES

1. Electric heating appliances not exceeding 2000 watts may be 115 volts. Electric heating appliances exceeding 2000 watts must be 230 volts; but, if the appliance consists of more than one separate heating element, each not exceeding 2000 watts, the elements may be 115 volts provided they are balanced on three wires, 115-230 volts.

2. Customers are cautioned against connecting electric irons, percolators, stoves or other heating utensils and appliances to sockets and attachment plugs, the rated capacity of which is less than the current required for the utensil.

Standard key sockets are rated at 250 watts; standard keyless sockets and attachment plug receptacles are rated at 660 watts. Appliances requiring in excess of the above should be connected to separate circuits and fittings of the proper capacity for the current required.

3. Electric welding apparatus, electric furnaces and other special forms of electric heating equipment will be accepted for connection to the Company's lines only under conditions and arrangements specified by the Company for each particular case.

ARTICLE 18

STEREOPTICON AND MOTION PICTURE APPARATUS

1. Stereopticon and motion picture apparatus using incandescent lamps not exceeding 1500 watts, may be 115 or 230 volts.

2. Stereopticon or motion picture apparatus using incandescent lamps exceeding 1500 watts, or using arc lamps, must be 230 volts.

(See Article 5, Section 2, concerning Theatres and Motion Picture Houses.)

3. Motor generator sets and rotary converters are subject to the same general requirements as motors. (See "Motors," Article 14.)

ARTICLE 19

BATTERY CHARGING APPARATUS

1. On the direct current system, battery charging apparatus taking not over 50 amperes may be 115 or 230 volts but, if more than one 115 volt unit is used, they must be balanced on the three wire system. Apparatus requiring in excess of the above must be 230 volts.

2. On the alternating current system, transforming apparatus for vehicle charging purposes, such as mercury arc rectifiers, must be 230 volts, excepting portable apparatus taking not over 660 watts, which may be 115 volts.

Motor generator sets and rotary convertors are subject to the same general requirements as motors. (See "Motors," Article 14.)

ARTICLE 20

MISCELLANEOUS ELECTRICAL APPARATUS

1. Electrical apparatus not considered in the previous sections of this book, such as radio, X-ray, etc., will be accepted for connection to the Company's lines only under conditions prescribed by the Company for each individual case.

2. Radio installations must be equipped with a surge protector, which will be furnished and installed by the Company at the expense of the customer.

ARTICLE 21

AN ACT

To prevent the interference of unauthorized persons with the electrical conductors and electrical appliances and machinery of companies using, generating or supplying electricity for light, heat or power.

Section 1—Be it enacted, etc., that it is hereby made unlawful for any person or persons to connect or disconnect any electrical conductors belonging to any company, using or engaged in the manufacture and supply of electric current for purposes of light, heat and power, or either of them, or to make any connection with any such electrical conductors for the purpose of using or wasting the electric current, or to in any wise tamper with any meter used to register current consumed, or to interfere with the operating of any dynamo or other electrical appliance of such company, or to tamper with or interfere with the poles, wires and conduits used by such companies, unless such person or persons shall be duly authorized by or be in the employ of such company:

Provided—That nothing in this act shall in any way interfere with any lawful supervision and control of electric light and power companies, their electric conductors, appliances, machinery and poles by the municipality within which such companies are doing business, or by the officers of such municipality, nor shall anything in this act interfere with any right now existing in the councils of any municipality to pass ordinances relating to and regulating such electric light and power companies.

Section 2—That any person or persons found guilty of any of the provisions of Section 1 of this act shall be deemed guilty of a misdemeanor and shall, upon conviction thereof, be imprisoned not exceeding one year, or fined not exceeding one thousand dollars, or both, or either, at the discretion of the court.

Section 3—That this act shall take effect from the date of its passage.

Approved the 25th day of June, A. D. 1895.

Pennsylvania Legislative Acts

governing

BUILDING CONSTRUCTION

in

PHILADELPHIA, PA.

Reprint through the courtesy of the LEGISLATIVE RESEARCH BUREAU, Harrisburg, Pennsylvania

CREATING BUREAU OF BUILDING INSPECTION

No. 123

AN ACT

Entitled an act to create a Bureau of Building Inspection, and to regulate the construction, maintenance and inspection of buildings and party walls in cities of the first class.

Section 1. Be it enacted, etc., That there shall be in the cities of the first class a Bureau of Building Inspection attached to the Department of Public Safety, and under the supervision and control of the Director of Public Safety.

Section 2. The chief officer of said Bureau shall be called the Chief of the Bureau of Building Inspection, and shall be either a practical builder, civil engineer, bricklayer or carpenter; the other officers of the said Bureau shall consist of such number of inspectors, clerks and messengers as the City Councils may, from time to time, by ordinance determine. All of said officers shall be appointed by the Director of Public Safety. All of the inspectors shall be either practical builders, civil engineers, carpenters or bricklayers, but shall not all be of the same occupation. None of the aforesaid officers shall be employed or engaged in any other business or be interested in any contract for building or furnishing materials to be used for building in the said cities. The City Councils shall, from time to time, fix their salaries. Every such inspector, before he enters upon the duties of his office, shall be required to make and subscribe before some person authorized by law to administer the same, the following oath or affirmation: "I do solemnly and sincerely swear, or affirm (as the case may be), that I am duly qualified by law to act as an inspector of buildings, and that I will faithfully, impartially and truly execute and perform the duties of an inspector of buildings, and see that the buildings inspected by me are built as required by the laws of this Commonwealth, according to the best of my judgment and abilities." Which said oath or affirmation shall be reduced to writing and filed in the office of the Prothonotary of the Court of Common Pleas, and shall be entered on the record in said office; every such person shall, moreover, before entering on the duties of his office, execute a bond to the Commonwealth, in the sum of five thousand dollars, with one or more sureties to be approved by the said court, or by two of the judges thereof in vacation, conditioned for the faithful performance of the duties imposed upon him by law, which bond shall be for the use of the said cities and of any and all persons who may be aggrieved by the acts or neglect of such inspector; and the bond hereinbefore provided for, conditioned for the faithful performance of his duties, shall be cancelled and marked satisfied of record by the City Solicitor upon the request of the Director of Public Safety; who shall first certify that

the accounts of such inspector are correct, and that there is no default, and no claim has come to his knowledge from or on behalf of any person or persons alleged to have been aggrieved by the acts or neglect of such inspector.

Section 3. The Chief of the Bureau of Building Inspection shall, under the direction of the Director of Public Safety, have the management and control of all matters pertaining to the Bureau of Building Inspection. In case of the temporary absence or disability of the Chief of the Bureau, the Director of Public Safety may appoint one of the inspectors as his deputy, and such deputy shall, during such absence or disability, exercise all the powers of the Chief of the Bureau.

Section 4. The inspectors of buildings shall, under the direction of the Chief of the Bureau of Building Inspection examine all buildings in the course of erection as often as practicable, and shall make written reports to the said Chief of the Bureau of Building Inspection of all violations of this act, together with the street and number where such violations are found, the name of the owner, agent or contractor, and other matters relative thereto. The inspectors of buildings shall, under the direction of the Chief of the Bureau of Building Inspection, examine all buildings damaged by fire or accident; a record shall be made of all walls or buildings found unsafe or dangerous, with the name of the owner or agent, and the street and number where such dangerous walls or buildings exist.

Section 5. It shall be unlawful to proceed with the erection, enlargement, alteration, repair or removal of any building or part thereof, or any platform or staging to be used for standing or seating purposes, or of any structure within the meaning of any of the provisions of this act, unless a permit shall first be obtained from the Bureau of Building Inspection; application for permits shall be made in writing by the owner or his agent, and shall be made upon forms or blanks to be issued for that purpose; the said application shall remain on file with the Bureau of Building Inspection. The Chief of the Bureau may require, in addition to the application for a permit, such plans and specifications as shall sufficiently set forth the extent and character of the work in all its structural parts, together with an affidavit of the truth of the facts set forth in the application, and no permit shall be given until the application, together with the plans and specifications accompanying and illustrating the same, have been approved by the Bureau of Building Inspection; but no such plans and specifications shall be approved unless they conform to the provisions of this act. The Chief may require any applicant for a permit to give notice of the application to any persons whose interests may be affected by the proposed work. Nothing in this section shall be construed to prevent the Chief of the Bureau of Building Inspection from granting a permit for the erection of a building or other structure where plans and detailed statements have been presented for the same before the entire plans and specifications have been submitted.

Section 6. It shall be unlawful to erect any building or other structure, for which permit has been granted, except it be in conformity with the application and the plans and specifications on file and approved by the Bureau of Building Inspection. A duplicate set of the approved plans and specifications must be kept at the building or other structure during its erection or alteration and be accessible at all times to the inspector. The Chief of the Bureau of Building Inspection, or any inspector of said Bureau under the direction of the Chief, shall have authority to order any change from the application or plans and specifications on file in the office of the Bureau. Should it be found, upon inspection, that there are conditions which make such change necessary, notice of such change shall be given in writing to the owner or his agent, or to the contractor in charge of the work: Provided, That no such change shall be made except it conform to the provisions of this act.

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

Section 7. Permits shall be granted or refused within fifteen days after the application and the submission of the plans and specifications. Every permit shall be considered cancelled if active work is not commenced within the period of six months from the date of its issue. Ordinary repairs to buildings may be made without notice to the Bureau of Building Inspection, but such repairs shall not be construed to include the cutting away of any stone or brick wall, or any portion thereof, the removal or cutting of any beam or support; or the removal, change or closing of any stairway.

Section 8. Any applicant for a permit from the Bureau of Building Inspection, required by the act, whose application has been refused, or any person who has been ordered by the inspector to incur any expense, may appeal by giving notice in writing of such appeal. If the appeal shall be from an order refusing a permit, it shall be taken within fifteen days from the refusal of such permit and not thereafter. If the appeal is from an order to take down and remove a dangerous building or structure, or a dangerous wall or walls, it shall be taken within three days from the issuing of such order and not thereafter. In computing the time within which an appeal may be taken, if the last day shall fall on Sunday or on a legal holiday, the appeal shall be taken on the preceding day. Notice of appeal may be given by leaving the same at the office of the Bureau of Building Inspection, either with the inspector or with the Chief of the Bureau or with the clerk.

Section 9. Any person, the value of whose property may be affected by work done or to be done under any permit granted by the Bureau of Building Inspection, may, within three days after the commencement of the work, appeal by giving notice in writing that he does so appeal. All cases in which appeals have been taken as above provided shall be referred to the entire corps of building inspectors as a Board of Appeal. The said Board of Appeal shall, after hearing, direct the inspector to issue his permit under such conditions, if any, as they may require, or to withhold the same, or make such other and further order in the premises as to the board shall seem proper: Provided, That should any party aggrieved object to the decision of the Board of Appeal, he, she or they may further appeal in writing to the Director of the Department of Public Safety within three days of the decision of the Board of Appeal, specifying in such appeal the reasons and ground therefor, and accompanying the same by the sum of thirty (30) dollars. The Director of the Department of Public Safety shall thereupon appoint an examining commission, to consist of three disinterested experts, who shall be either master builders, engineers, or architects, who shall, within such time as the director shall specify, carefully consider the said appeal and make decision thereon. The decision of any two shall be the decision of the commission. They shall be paid for their services ten (10) dollars each.

Section 10. The decision of a building inspector, unappealed from, shall be final and conclusive in any subsequent proceeding on the matter in question in court or otherwise. The decision of the Board of Building Inspectors as a Board of Appeal, in case such decision is not appealed from as above provided, shall be final and conclusive in any subsequent proceeding in court or otherwise. The decision of the examining commis-

sion in case of appeal to such commission, shall be final and conclusive when certified to the building inspectors: Provided, however, That no commission, named in accordance with this act, shall have any power or authority to set aside or nullify or alter any of the provisions herein, or order or require any permit to be issued for a building to be constructed otherwise than is herein required.

Section 11. All buildings hereafter erected or altered in said cities, except such as are hereinafter provided for, shall have all outside or division walls constructed of stone, brick, iron or other hard, non-combustible material, properly bonded and solidly put together; all the said walls shall be built to a line and carried up plumb and straight, and the several component parts of such buildings shall be constructed in such manner as herein provided. Provided, That Councils may, by a general ordinance, permit and regulate the construction of frame buildings in the rural portions of said cities, within such limits as may be designated in said ordinance.

Section 12. The foundation walls of all buildings, excepting those that are erected on wharves or wharf piers on a water front, shall be laid not less than three feet below the exposed surface of the earth on the solid ground or level surface of rock. Where solid earth or rock is not obtainable, the said walls may be supported by a foundation of wooden piles or caissons, filled with concrete or such other foundation as the Bureau of Building Inspection shall direct. Piles intended for a wall, pier or post to rest upon shall not be less than five (5) inches in diameter at the smaller end, and shall be spaced not more than thirty (30) inches on centres, or nearer if required by the Bureau of Building Inspection, and they shall be driven to a solid bearing. No pile shall be weighted with a load exceeding forty thousand (40,000) pounds. The tops of all piles shall be cut off below the lowest water line where required; concrete shall be rammed down in the interstices between the heads of the piles to the depth and thickness of at least twelve (12) inches, and for one foot in width outside of the piles. Where ranging and capping timbers are laid on piles for foundations, they shall be of hard wood, not less than six (6) inches thick, and properly joined, and their tops laid below the lowest water line.

Section 13. Foundations of other materials than piles shall be so proportioned that the loads upon the soil shall not exceed the limits for the different kinds of soil than herein given, to wit: sand and loose gravel, three and one-half tons per square foot; dry, hard clay, three and one-half tons per square foot; cemented gravel, six tons per square foot; for soils other than those above specified, the loads to be determined by the Bureau of Building Inspection. No foundation shall be laid on any soil containing organic matter. The footing or base course shall be of stone or concrete, or both, or steel beams bedded in concrete, or concrete and stepped-up brickwork; all of the said footing or base courses to be of sufficient thickness, breadth and strength to safely bear the weight to be imposed thereon. If the footing or base course be of concrete, the concrete shall not be less than twelve (12) inches thick; if of stone, the stones shall be laid edge to edge, and shall not be less than two (2) by three (3) feet, and at least eight (8) inches in thickness for walls, and ten (10) inches in thickness for piers or columns. If stepped-up footings of brick are used in place of stone above the concrete, the offsets shall be laid in single courses, and shall not exceed one and one-half inch, starting with the brickwork, covering the entire width of the concrete. If steel beams or rails are used for a footing or base course, they must be thoroughly embedded in concrete, the ingredients of which must be such that after proper ramming the interior of the mass will be free from cavities; the beams or rails must be entirely enveloped in concrete, and around the exposed external surfaces of such concrete there must be a coating of cement, of standard quality, at least one (1) inch thick; this concrete, and all concrete in contact with metal work,

shall be made of Portland cement, and the broken stone used shall not be limestone of any character.

Section 14. All foundation walls and cellar walls shall be built of stone or brick; if constructed of stone, they shall be at least six (6) inches thicker than the wall next above them to the depth of twelve (12) feet below said wall, and shall be increased six (6) inches in thickness for every additional ten (10) feet in depth below the said twelve feet; and if of brick, they shall be at least four (4) inches thicker than the wall next above them to a depth of twelve (12) feet below the said wall, and shall be increased four (4) inches in thickness for every ten (10) feet below said twelve feet; if there be cellars or excavations, foundation walls, except in dwelling houses, shall start at least twelve (12) inches below the cellar bottom. Foundation walls for dwellings, private stables and carriage houses, and buildings of a light character, if of stone, shall not be less than eighteen (18) inches thick; all foundations shall be sufficiently strong to resist lateral pressure. In buildings built to the street grade, the foundation shall not be built above the curb level: Provided, That the Bureau of Building Inspection may exempt buildings from this requirement when it appears to the Bureau that the buildings are located on a street which is not likely to be used for business purposes, and that the said Bureau may make necessary rules and regulations for such exemption.

Section 15. All stone walls shall be laid to a line, plumb and straight, and shall be faced on both sides. Walls twenty-four inches or less in thickness shall have at least one header extending through the walls every three (3) feet in height from the bottom of the wall and in every four (4) feet in length, and if over twenty-four inches in thickness shall have one header for every six (6) superficial feet on both sides of the wall. All headers shall consist of good flat stones; each stone shall be thoroughly bedded in mortar under the entire area, in such manner that it will not rock. All interstices between individual stones must be thoroughly filled with mortar, and, if the spaces should be large, pieces of broken stone must be driven into the mortar. Walls used for underpinning shall be composed of large flat stones or hard brick, as the Bureau of Building Inspection may direct, the said walls to be laid up in cement mortar. Where wedges are used, the said wedges shall be of iron or steel. This section shall not be construed to prevent the building of such battered walls as shall be approved by the Bureau of Building Inspection.

Section 16. Foundation walls of dwellings, stables and carriage houses, and buildings of similar light construction, may be laid in lime mortar. The foundation walls of all other buildings shall be laid in cement mortar: Provided, That this section shall not be construed to prohibit the use of cement and lime mortar, when in the judgment of the Chief of the Bureau of Building Inspection the nature of the construction may permit of its use.

Section 17. It shall be unlawful to use concrete, or mortar of any kind, the ingredients of which are not thoroughly mixed, and which are not free from lumps or other unmixed portions of any of the ingredients. Cement mortar shall be made of sand and cement in the proportions of not more than three parts of sand to one part of cement, and shall be used immediately after mixing. Cement and lime mortar shall be made of one part lime, one part cement, and three parts sand to each. Lime mortar shall be made of not more than four parts of sand to one part of fresh-burnt lime, and shall not be used before being thoroughly slaked. Concrete for footings and foundations shall be made of one part of cement, two parts of sand, and five parts of small, clean, broken stones. Cement used in all the said mortars and concrete shall be Portland, or other equally good quality; the sand shall be clean and sharp and free from earthy matter.

Section 18. The thickness of brick walls for business, manufacturing and public buildings, seventy-five to one hundred and twenty-five feet long by twenty-six feet or less, clear span, shall not be less than the number of inches in the following table:

	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth	Eleventh	Twelfth
One-story	13	..	..	..	..	..	..	..	..	..	..	..
Two-story	13	13	..	..	..	..	..	..	..	..	..	..
Three-story	18	13	13	..	..	..	..	..	..	..	..	..
Four-story	18	18	13	13	..	..	..	..	..	..	..	..
Five-story	22	18	18	13	13	..	..	..	..	..	..	..
Six-story	22	22	18	18	13	13	..	..	..	..	..	..
Seven-story	26	22	22	18	18	13	13	..	..	..	..	..
Eight-story	26	26	22	22	18	18	13	13	..	..	..	..
Nine-story	30	26	26	22	22	18	18	13	13	..	..	..
Ten-story	30	30	26	26	22	22	18	18	13	13	..	..
Eleven-story	34	30	30	26	26	22	22	18	18	13	13	..
Twelve-story	34	34	30	30	26	26	22	22	18	18	13	13

For buildings of the same character, less than seventy-five feet long; also, hotels, apartment and tenement houses, the thickness of the walls may be reduced by making the three upper stories thirteen (13) inches thick, and following from that down to the lowest story in the same sequence as in the above table. Non-bearing walls of buildings, hereinbefore in this section specified, may be four (4) inches less in thickness: Provided, however, That none are less than thirteen (13) inches thick, except as hereinafter specified. If there is to be a clear span of over twenty-six feet between walls, the bearing walls shall be four (4) inches more in thickness than is in this section specified, for every thirteen (13) feet or fraction thereof, the said walls are more than twenty-six feet apart; all buildings over one hundred and twenty-five feet in length or depth, without a cross wall or proper piers or buttresses, shall have the side or bearing walls increased in thickness four (4) inches more than is specified, for every seventy-five (75) feet or fraction thereof that said walls are over one hundred and twenty-five feet in length. The amount of materials elsewhere herein specified may be used in either piers or buttresses, but no curtain wall between such pier or buttress shall be less than thirteen (13) inches thick. Walls surrounding stairs, elevator shafts, fire escapes and light walls, if of brick, shall not be less than eight (8) inches thick; but they shall be increased in thickness, with the increase in height, to a sufficient extent to keep the load on the brickwork within the maximum load elsewhere herein specified. Nothing in this section shall be construed to prevent the erection of light wells, constructed of a framework of iron or steel, filled in with glass.

Section 19. The height of stories for all given thickness of walls must not exceed eleven (11) feet in the clear for basement, eighteen (18) feet in the clear for the first story, fifteen (15) feet in the clear for the second story, fourteen (14) feet in the clear, average height, for any upper story; and if any story exceeds these heights, respectively, the walls of such story and all the walls below the same shall be increased four (4) inches in thickness, additional to the thickness already mentioned.

Section 20. Stores, warehouses and factories over twenty-six feet, clear span, shall have the floors carried on brick partition walls, or girders supported by columns of wood or iron, or piers of masonry. Iron or steel trusses or girders may be used: Provided, The supporting walls are increased in thickness by the addition of piers or buttresses to a sufficient extent to keep the load on the brickwork within the maximum load elsewhere herein specified.

Section 21. In no case shall any wall or walls of any building be carried up more than two stories in advance of any other wall without the permission of the Bureau of Building Inspection. The front, rear, side and party walls should be properly bonded together, or anchored to each other, every six (6) feet in their height, by wrought-iron tie anchors not less than one and one-half (1½) inches by three-eighths (⅜) of an inch in size. The said anchors shall be built into the side or party walls not less than sixteen (16) inches, and into the front and rear walls so as to secure the front and rear walls to the side or party walls when not built and bonded together.

Section 22. In brick walls, at least every seventh course of brick shall be a heading course, except where walls are faced with face brick, in which case at least every seventh course shall be bonded with Flemish headers, or by cutting the corners of the face brick and putting diagonal headers behind the same, or iron ties. In all buildings where the walls are built hollow the same amount of brick or stone wall shall be used in their construction as if they were solid, as heretofore set forth, and no hollow bearing walls shall be built unless the two walls forming the same shall be connected by proper ties of the same material as the walls, or stone or iron, placed not over two feet apart. The inside four inches of all walls may be built of hard burnt hollow clay, or porous terra-cotta blocks properly tied and bonded into the walls, and of the dimensions of ordinary brick.

Section 23. All walls of brick shall be thoroughly bonded and solidly put together, and shall be built to a line, plumb, level and straight; all bricks to be laid and bedded with well filled joints. Every course when laid shall have the joints well flushed up; all bed joints not covered are to be struck. The brick walls below the curb level of all buildings, other than dwellings and buildings of a similar light construction, shall be laid in cement mortar. Piers built for the support of any column, post or wall shall be laid in cement mortar: Provided, That this section shall not be construed to prohibit the use of cement and lime mortar, when in the judgment of the Chief of the Bureau of Building Inspection the nature of the construction may permit its use. The brick used in all buildings of this character shall be good, hard, well burned and well-shaped brick.

Section 24. Inspectors of buildings shall, upon the application of any owner or owners of any buildings or their authorized agents, or upon the application of any person or persons about to erect any new building or buildings, examine any or all existing party or division walls, and if they are deemed by the Inspector to be defective, out of repair, or insufficient and unfit for the purpose of the old building existing upon the adjoining premises, or of the new buildings about to be erected, such party or division wall or walls shall be repaired or made good or taken down by the parties building, as the Inspector's decision may be. In every case where such wall or walls are defective, out of repair, or insufficient for the purpose of the buildings there existing upon the adjoining premises and using the same, the cost or expense of such repair or removal, together with the expense of the new wall or walls to be erected in lieu thereof, shall be borne and paid by the owner of said buildings upon the adjoining premises and the party erecting the new buildings in proportion to the amount of such wall or walls which is or shall be respectively used by their said buildings; and in every case where such wall or walls are defective, out

of repair, or insufficient only for the purpose of the new buildings, the cost and expense of such repair or removal, together with the expense of the new wall or walls to be erected in lieu thereof, shall then be borne and paid exclusively by the parties erecting the new buildings, and they shall also in such case make good all damages occasioned thereby to the adjoining premises.

Section 25. Walls heretofore built for or used as party walls, whose thickness at the time of their erection was in accordance with the requirements of the then existing laws, but which are not in accordance with the requirements of this act, may be used, if in good condition, for the ordinary use of party walls: Provided, The height of the same be not increased. In case it is desired to increase the height of the existing party or independent walls, which walls are less in thickness than required under this act, the same may be done with a lining of brickwork to form a combined thickness with the old walls of not less than four inches more than the thickness required for a new wall, corresponding with the total height of the wall when so increased in height. The said lining shall be supported on proper foundations and carried up to such height as the Bureau of Building Inspection may require. No lining shall be less than nine (9) inches in thickness, and all lining shall be laid up in cement mortar, and thoroughly anchored to the old brick walls with suitable wrought-iron anchors, placed two (2) feet apart, and properly fastened or driven into the old walls in rows, alternating vertically and horizontally with each other; the old walls being first cleaned of plaster and other coatings where any lining is to be built against the same. In all cases where there is such increase of walls a new foundation shall be built, in such manner as to carry jointly both the new and old walls, and the soil under such foundation shall not be loaded beyond the limits elsewhere herein specified. This section shall not be construed to prohibit the raising of the party walls in dwellings an additional story, if upon inspection, the walls are found good, and the load on the brickwork is within the maximum elsewhere herein specified.

Section 26. No recess shall be made in any wall more than one-third of its thickness. Recesses for alcoves shall not exceed eight (8) feet in width, and shall be arched over and not carried up higher than eighteen (18) inches below the floor next above. The aggregate area of recesses in any wall shall not exceed one-fourth of the whole area of the face of the wall on any story, nor shall any such recesses be made within a distance of six (6) feet of any other one in the same wall. If there be stone ashlar used for the facing of any building, the said stone ashlar, if three inches thick or less, shall not be reckoned in the thickness of the wall. All stone used for the facing of any building, except where built of alternate headers and stretchers, shall be strongly anchored with iron anchors, set in each stone at least one (1) inch.

Section 27. The minimum thickness for all walls of dwellings, private stables and carriage houses, and buildings of a similar light construction, shall be as follows: All such buildings with a width of sixteen (16) feet or less, providing they do not exceed sixty (60) feet in length and thirty-five (35) feet in height, shall have walls of not less than nine (9) inches. If over sixteen (16) feet and less than eighteen (18) feet in width, the party walls shall be thirteen (13) inches thick, and the side or gable walls nine (9) inches thick. If eighteen (18) feet and over and less than twenty (20) feet in width, the side or gable walls shall be thirteen (13) inches for two stories. If twenty (20) feet and over in width, all the walls shall be at least thirteen (13) inches thick the entire height. No soft or salmon brick shall be used in the exposed walls of any building described in this section. All walls shall be squared up thirteen (13) inches thick, with hard brick to the first floor joists. The Chief of the Bureau may

increase the thickness of any of the walls herein specified, if in his judgment, the nature of the construction requires it to be done. Party walls, if built of stone, shall not be less than sixteen (16) inches. The party walls of all buildings shall be built up and extended at least ten (10) inches above the roof, and shall be coped with stone or metal or other hard incombustible material. Where the roof is mansard, unless the same is constructed of fire-proof material throughout, the lower slope of said wall shall extend at least six inches distant and parallel with the roof covering, and be corbelled to the outer edge of all projections and coped with incombustible material. All party walls shall be built solidly from cellar bottom to the top of the fire wall: Provided, That with the approval and under the supervision of the Bureau of Building Inspection openings may be made in party walls of contiguous buildings.

Section 28. No dwelling house shall be erected on a lot of a less average width than fourteen (14) feet: Provided, That this limitation shall not apply to lots of less than fourteen feet in width having buildings erected thereon. Provided further, That a dwelling house may be erected on a lot of less width than fourteen (14) feet, and a lot of less width than forty-two (42) feet may be subdivided into lots of equal width, upon which dwelling houses may be erected, but no such lot shall be decreased in width to a greater extent than five per centum of fourteen (14) feet. This provision shall only apply when the aforesaid lots are bounded by ground having buildings erected thereon at the time of the approval of this act, or when bounded on each side by ground belonging to other owners at the time of the approval of this act, and every such dwelling shall have an open space attached to it in the rear or at the side equal to at least one hundred and forty-four (144) square feet of clear space, unobstructed by any overhanging structure. In all dwellings hereafter erected the cellars shall extend underneath the whole house and be ventilated from both ends. In low, damp or made ground the bottom of all cellars shall be covered with concrete or asphalt at least three (3) inches thick, or such material as shall be approved by the Bureau of Building Inspection.

Section 29. In buildings hereafter erected, altered or repaired, all chimneys shall be built of brick, stone or other incombustible material. Brick chimneys shall have walls at least nine (9) inches thick, unless terra-cotta flue linings are used, in which case four and one-half (4½) inches of brickwork may be omitted. All chimneys or smoke flues shall have a wall nine (9) inches thick at the back, and when corbelled out shall be supported by at least five courses of brick, and, if supported by piers, the same shall start from the foundation on the same face with the breast above. All chimneys shall be bonded to the walls at every course from the bottom to the top. The inside of all brick flues shall be built of hard brick and have struck joints, except when lined with terra-cotta. All chimneys shall be topped out at least four (4) feet from above the top of the roof at point of contact, if a flat roof, and at least two (2) feet above the ridge of a pitched roof. No chimney shall be less than eight (8) by eight (8) inches when used as a smoke flue. No chimney in any building already erected or hereafter to be built shall be cut off below, in whole or in part, and supported by wood but shall be wholly supported by stone, brick or iron, and all chimneys in any building already erected or hereafter to be erected, which shall be dangerous in any manner whatever, shall be repaired and made safe or taken down. No wood furring shall be used against or around any chimney, but the plastering shall be directly on the masonry or on the metal lathing. Flues of ranges and boilers, and other similar flues shall have the outside exposed to the height of the ceiling, or be plastered to the bricks.

Section 30. All hearths shall be supported by trimmer arches of brick, stone, iron or concrete, or be of single stone at least six (6) inches thick, built into the chimney and supported by iron beams, one end of which shall be securely built into the masonry of the chimney or an adjoining wall, or which shall otherwise rest upon incombustible support. The brick jambs of every fire-place or grate opening shall be at least nine (9) inches wide each, and the backs of such openings shall be at least nine (9) inches thick. All hearths and trimmer arches shall be at least twelve (12) inches longer on either side than the width of such openings, and at least eighteen (18) inches wide in front of the chimney breast. Brickwork over fire-places and grate openings shall be supported by iron bars, or brick or stone arches. All brick-set or portable ranges shall be set on hearths of brick, slate or cement, the said hearths to extend at least twelve (12) inches beyond the face of the range. No brick-set or portable range, or heating apparatus of any kind, shall be set against a wood or lath and plaster partition.

Section 31. No stove-pipe in any building with combustible floors and ceilings shall hereafter enter any flue nearer than twelve (12) inches from the floor or ceiling, and in all cases when smoke-pipes pass through the stud or wooden partitions, floor or roof, whether plastered or not, they shall be guarded by either a double collar of metal, with at least two (2) inches of air space all around and holes for circulation of air, or by a soapstone ring or solid casting of plaster of paris, not less than three (3) inches in thickness, and extending through the partition, or by an earthenware ring one (1) inch from the pipe at every joint.

Section 32. In all cases where hot water, steam, hot air or other furnaces are used, the furnace smoke-pipe shall be at least two (2) feet below the joists or ceiling above the same, unless said joists or ceiling shall be properly protected by a shield of metal plate suspended above the said pipe with at least three (3) inches of space for the free circulation of air above and below the said shield, in which case the smoke-pipes shall be kept at least ten (10) inches from the aforesaid joists or ceiling; and the tops of all furnaces set in brick must be covered with brick, slate or metal, supported by iron bars, and so constructed as to be perfectly tight; said covering to be in addition to and at least six (6) inches from the ordinary covering to the hot air chamber. The tops of all heating furnaces not set in brick shall be at least ten (10) inches below the joists or ceiling with a shield of metal plate made tight and suspended below the said joists or ceiling at least three (3) inches, and extending one (1) foot beyond the furnace on all sides. No boiler to be used for steam or motive power, and no furnace shall be placed on any floor above the cellar floor unless the same is set on non-combustible beams and arches, or an incombustible platform, and in no case without a permit from the Bureau of Building Inspection.

Section 33. All hot air registers set in the floor of any building shall be set in a border of soapstone or other fire-proof material, and all floor or register boxes to be made of sheet metal with flange on top to fit the groove in the border, the register to rest upon the same, and there shall also be an open space of two (2) inches on all sides of the register box, extending from the under side of the ceiling to the border of the floor, the outside of the space to be covered with a casing of metal, made tight on all sides, and to extend from the under side of the aforesaid ceiling up to and turn under the said border. No tin or metal flue or flues, pipe or pipes, or register box or boxes of a single thickness of metal, used and intended to convey heated air in any building hereafter to be built, altered or repaired, shall be allowed, unless the same be built in a wall of brick or stone. In all other cases, the said flue or flues, pipe or pipes, register box or boxes, shall be made double; that is, two pipes, one inside the other, at least one-

half (½) inch apart, or covered with wire lathing, and the studding covered with tin or other fire-proof material, so as to be thoroughly fire-proof: Provided, That it shall not apply to pipes leading from a heater to the hot air flue. No wood furring or lath shall be placed against any flue, metal pipe or pipes, used to convey heated air or steam in any building. No permanent or stationary heating apparatus of any kind whatever shall be introduced in any building now erected without a permit from the Bureau of Building Inspection.

Section 34. In no building shall any wooden girders, joists or timbers be placed nearer than four (4) inches of the outside of any smoke, hot air or other flue; and all joists or other timbers in the party walls of any buildings hereafter erected, whether built of stone, brick or iron, shall be separated from the joists or timbers entering into the opposite side of the wall by at least four (4) inches of solid mason work. Every trimmer over four feet long, except in a dwelling, shall be hung in wrought or malleable iron stirrups of suitable dimensions, and no timber shall be used in any wall of any building where stone, brick or iron is commonly used, except bond timbers and lintels as hereinbefore provided for, or as may be approved by the Inspector, and no exposed bond timber in any wall shall in width and thickness exceed that of a course of brick. Where stud partitions are parallel with the joists, the joists supporting them are to be doubled in all cases. No wooden floor joists or roof rafters used in any building other than a frame building shall be of less thickness than three (3) inches. Each tier of joists shall be anchored to the bearing walls, at intervals of not more than ten (10) feet, with good, strong, wrought-iron anchors. Where the joists are supported by girders, the girders shall be anchored to the walls, all the said joists or girders shall be so anchored that in falling they will free their own anchorage without injury to the wall. The ends of joists resting upon girders, if butted together end to end, shall be strapped with wrought-iron straps at the same joist that is anchored to the wall, or they may lap each other and be thoroughly spiked or bolted together. Where joists are hung in iron stirrups from the girders they must be strapped as before described. Floor joists shall be placed not more than sixteen (16) inches from centre to centre, and must be properly bridged. All joists that are used must be sound and well seasoned. No floor joists shall be blocked up or levelled on more than one dry course of brick.

Section 35. The planking and sheathing of the roof of every building hereafter to be erected or altered shall in no case be extended across the party wall thereof, and every such building and the tops and sides of every dormer window thereon shall be covered with slate, zinc, tin, iron, copper, or such other equally good fire-proof material as the Bureau of Building Inspection may authorize; and the outside of every dormer window hereafter placed on any building as aforesaid, shall be made of some fire-proof material, and wooden buildings which require roofing, shall not be roofed with any other covering except as aforesaid: Provided, That this shall not apply to roofs and dormers in rural and suburban districts. Nothing in this section shall be construed to prohibit the repairing of a shingle roof provided the repairs do not amount to over one-half of the value of said roof, in which case the whole must be replaced by some fire-proof material. All buildings shall be kept provided with proper metallic leaders for conducting water from the roof to the ground or sewer, in such manner as shall protect the walls and foundations from damage.

Section 36. All buildings of three or more stories hereafter to be built with two or more stories back buildings, shall have scuttle frames and covers or bulkheads and door, and be covered with some fire-proof mate-

rial. All scuttles shall have stationary ladders leading to the same, and all such scuttles and ladders shall be kept so as to be ready for use at all times. All scuttles shall be in size of opening at least eighteen (18) inches by thirty (30) inches, and if a bulkhead is used in any building in place of a scuttle it shall have stairs, with a sufficient guard or hand-rail, leading to the roof; and in case the building be a tenement house, the doors or covers to the scuttle or bulkheads shall at no time be locked, but may be bolted or secured by hooks on the inside.

Section 37. All exterior cornices and gutters hereafter erected shall be of some fire-proof material, and in every case, except when carried on a frame work of iron or steel, the greatest weight of the material of which the cornice shall be constructed shall be on the inside of the outer line of the wall, allowance being made for the leverage produced by the projection of the cornice beyond the face of the wall, and in all cases the walls shall be carried up to the under side of the roof planking and where the cornice projects above the roof, the wall shall be carried up to the top of the cornice. All exterior wooden cornices that may be or shall hereafter become unsafe shall be taken down, and if replaced, shall be constructed of some fire-proof material. All exterior wood cornices or gutters that may hereafter be damaged by fire or by decay to the extent of one-half the value thereof, shall be taken down, and if replaced shall be constructed of some fire-proof material, but if not damaged to this extent, may be repaired with the same kind of material of which originally constructed. The cornice on every building shall be separated from the cornice on an adjoining building by having the party wall corbelled out at least two (2) inches beyond all projections, or by such other fire stop as shall be approved by the Bureau of Building Inspection. This section shall not be construed to prohibit the use of a wooden cornice upon buildings which have shingle roofs, as hereafter in this act provided.

Section 38. All buildings hereafter erected or altered to be used as a school-house, hospital, asylum, hotel, apartment or tenement house, office building, store, manufactory, or workshop, or place of assembly or resort, shall have such number of good and sufficient stairways, or other means of egress, as shall be determined by the Chief of the Bureau of Building Inspection. Stores in which any of the stories above the second have a clear floor space of four thousand (4,000) square feet, and manufactories three or more stories in height, of the floor area per story, of three thousand (3,000) square feet shall have a tower stairway, completely inclosed, on the interior of the building, with brick walls or such other fire-proof materials as shall be accepted by the Bureau of Building Inspection. Should the floor area of any story above the second, in said stores or manufactories, exceed ten thousand (10,000) square feet, the Bureau of Building Inspection may require one or more additional tower stairways.

Section 39. Openings for doors and windows in all buildings, except as otherwise provided, shall have good and sufficient arches of stone, brick or terra-cotta, well built and keyed, with good and sufficient abutments or lintels of stone, as follows: For an opening not more than four (4) feet in width, the lintel shall not be less than seven and one-half (7½) inches in height and three (3) inches in thickness; for an opening of not more than six (6) feet in width, the said lintel shall not be less than ten (10) inches in height and four (4) inches in thickness; for an opening more than six (6) feet and less than eight (8) feet in width, the said lintel shall not be less than twelve (12) inches in height and four (4) inches in thickness; all lintels eight (8) feet and over in width, shall be iron or steel beams or girders. No lintels shall have a bearing of less than four and one-half (4½) inches on the walls, and on the inside of all openings six (6) feet or less in width, in which the lintels shall be less than the thickness of

the wall to be supported, there shall be a good and proper size timber lintel, which shall rest at each end not less than four and one-half (4½) inches on the wall, and shall be bevelled on each end, and shall have a double counter or dead arch turned over the same when practicable. Openings over six (6) feet and less than eight (8) feet in width, shall have the inside lintel of iron or steel; plank front frames of a width of five (5) feet or less, to be used in dwelling houses, may be exempted from the provisions of this section for lintels. All exterior window sills shall be of stone or other hard, incombustible material.

Section 40. All iron or steel beams or girders used as lintels to span openings eight (8) feet or over in width and not exceeding twelve (12) feet, upon which a wall rests, when not supported by iron or steel jamb boxes, shall have a bearing of at least eight (8) inches at each end by the thickness of the wall supported. For openings over twelve (12) feet, the bearing shall be at least twelve (12) inches. When the lintels or girders are supported at the ends by brick walls or piers, they shall rest upon cut granite or other stone blocks of equal strength, or cast-iron plates of equal strength may be used. If the opening is twelve feet or less, the stone block shall not be less than eight (8) inches thick, and shall be proportionately increased when the opening is more than twelve (12) feet. All blocks or plates used shall be the full size of the bearings. In all cases the bearing shall be sufficient to support the weight placed upon it with safety. All iron or steel beams or girders used in any building shall be throughout not less in width than the thickness of the wall to be supported.

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Section 41. All floors shall be constructed to bear a safe weight, per superficial foot, exclusive of the weight of the materials of which they are composed, as follows: Dwellings, tenement houses, apartment houses, hotels, hospitals or asylums, seventy (70) pounds; office buildings, one hundred (100) pounds; places of public assembly, light manufacturing and retail stores, one hundred and twenty (120) pounds; storehouses, warehouses and manufactories, one hundred and fifty (150) pounds; and upwards in proportion to the loads they have to carry. All roofs shall be constructed to bear a safe weight of thirty (30) pounds per superficial foot. The ultimate stress in pounds per square inch, to be applied in proportioning the materials to be used in building to safely carry the load stated above, shall be as follows:

	Extreme fibre tension.	Tension.	Compression.	Shear.
Cast iron	15,000	.....	70,000	.....
Wrought iron	.....	50,000	50,000	30,000
Mild steel	.....	58,000	58,000	35,000
Medium steel	.....	65,000	65,000	40,000

			Compression		Shear.	
	Extreme fibre tension.	Tension.	Compression.	Allowable perpendicular to grain.	Perpendicular to grain.	Parallel to grain.
Hemlock	3,600	4,000	2,100	250	2,500	250
Spruce	4,400	5,000	3,000	300	3,000	300
Long leaf yellow pine	6,400	7,200	4,500	550	4,500	400

Allowable pressure per square foot on concrete, fifteen tons.
Brickwork in lime mortar, eight tons.
Brickwork in lime and cement mortar, twelve tons.
Brickwork in cement mortar, fifteen tons.
Stonework (rubble) in lime mortar, five tons.
Stonework (rubble) in lime and cement mortar, eight tons.
Stonework (rubble) in cement mortar, ten tons.

The above figures in compression shall be reduced for columns, in proportion to length and least diameter, according to formula adopted by the Bureau of Building Inspection. The ultimate stresses as above given for timber are based on ordinary, straight grained and well-seasoned lumber. The allowable deflection for beams or girders shall not exceed one-thirtieth of an inch per foot of span where the ceiling is to be plastered, or one twenty-fifth of an inch per foot of span, where the ceiling is not to be plastered. The factors of safety shall be as one to four for all beams, girders and other pieces subject to transverse strain,

and as one to four for all posts, columns and other vertical supports, when of wrought-iron or rolled steel, and as one to six for other material subject to a compressive strain; and as one to four for tie rods, tie beams and other pieces subject to a tensile strain. Every temporary support used during the erection or alteration of any building shall be of sufficient strength to carry safely the load to be placed thereon.

(End of Section 41.)

FORMULA ADOPTED BY THE BUREAU OF BUILDING INSPECTION

The figures in compression given in Section 41 of Act approved May 5, 1899, shall be reduced for columns in proportion to length and least diameter according to following formula:

Cast Iron.

$$\frac{70000}{1+\frac{L^2}{400\,D^2}}$$

Wrought Iron.

$$\frac{50000}{1+\frac{L^2}{15000\,R^2}}$$

Mild Steel.

$$\frac{58000}{1+\frac{L^2}{13500\,R^2}}$$

Medium Steel.

$$\frac{65000}{1+\frac{L^2}{11000\,R^2}}$$

In which "L" equals length of column in inches, and "R" equals least radius of gyration in inches, and "D" equals diameter or least side in inches.

FOR WOODEN COLUMNS

$$U-\frac{UL}{100D}$$

In which "U" equals ultimate compression given above, and $\frac{\text{"L"}}{D}$ equals ratio of length to least diameter of column.

The allowable reduction of live load on columns and girders as mentioned in Section 43, of Act approved May 5, 1899, shall be as follows:

For all tenement houses, hotels, apartment houses, hospitals and office buildings the live loads on columns, girders and foundations may be estimated by the formula $X=100-\frac{4}{5}\sqrt{A}$, and for light manufacturing building by the formula $X=100-\frac{2}{5}\sqrt{A}$, in which "X" equals the percentage of live load to be used, and "A" equals area carried by any girder, column or foundation.

Section 42. In all stores, warehouses and factories, hereafter to be erected or altered, and all warehouses, storehouses, factories, workshops and stores, where heavy materials are kept or stored or machinery introduced, the weight that each floor will safely sustain upon each superficial foot shall be estimated by an architect or civil engineer. The weight that each floor will safely sustain, together with the date of examination and the name of the architect or civil engineer, shall be posted by the owner in a conspicuous place on each floor. The strength of the

materials shall be ascertained by computation, by the rules of standard authors on the strength of materials using the fibre stresses hereinbefore specified, and for other materials only such numbers as have been reduced from actual experiments on material of like kinds with that proposed to be used. The data and method of computation must be submitted to the Bureau of Building Inspection for verification, before posting.

Section 43. Rolled iron or steel beams and girders used to support floors or walls of buildings shall be so proportioned that the loads which may come upon them shall not produce strains in tension or compression of more than the allowable stresses hereinbefore specified. No material shall be used in any part of the construction of less thickness than one-quarter (¼) of an inch, except for filling or lining vacant places. No allowance shall be made for the web in calculating the flange section of plate girders. All connection shall be arranged for end connection angles, and all beams, where practicable, must be connected to the girders supporting them with the standard connections, as used by Pencoyd, Carnegie, Phoenix or other standard mills, and published in their hand books. Beams or girders whose length is more than twenty-five times their width must be supported laterally by bracing, independent of the load coming upon them. Webs of girders, whose unsupported depth is more than sixty times their thickness, must have stiffeners riveted on both sides of the web at points generally not farther apart than one and one-half times the full depth of the webplate, the stiffeners to be milled to fit tightly into the flange angles of the girder. At the points of local and concentrated loads and at bearing points, stiffeners shall be placed up against the flanges, and shall be proportioned as posts to transfer the loads at those points. All riveted work to be punched accurately with holes one-sixteenth (1/16) inch larger than the rivet, and when the pieces forming one built member are put together the holes must be truly opposite. No drifting to distort the metal will be allowed. All holes for field rivets shall be accurately drilled to an iron templet wherever possible; all rivets shall be machine driven and when so driven must completely fill the holes. All rivets shall be proportioned so that the shearing strain per square inch of section shall not exceed eleven thousand (11,000) pounds for steel, and nine thousand (9,000) pounds for iron, and the pressure upon the bearing surface of the projected semi-intrados (diameter x thickness) of the rivet shall not exceed twenty-two thousand (22,000) pounds per square inch for steel and eighteen thousand (18,000) pounds for iron. For field riveting the number thus found shall be increased twenty-five per centum. The pitch of rivets in direction of the strain shall not exceed six (6) inches. All connections in structural iron or steel work, so far as possible, shall be made with soft steel rivets. Tight fitting bolts may be used in reamed holes where it is impossible to drive the rivet. Columns of wrought iron or steel, supporting walls and floors of buildings, shall be so proportioned that the vertical loads which may come upon them, including the bending strain due to wind pressure, shall not produce strains in tension and compression of more than thirty (30) per centum additional to the allowable stresses hereinbefore specified. The vertical stresses on columns from live load shall not be reduced more than that given by formula adopted by the Bureau of Building Inspection. Abutting surfaces to be truly planed to even bearings throughout, and to be spliced so as to hold parts in proper position. Splices also to be proportioned for the bending in the columns due to side pressure, so that the strains on the bolts and rivets shall not produce strains of more than the allowable stresses hereinbefore mentioned. No column shall be greater in length than forty-five times its least width or one hundred and forty times its least radius of gyration. Every column shall rest upon a base

plate properly secured to columns, and shall be truly and squarely planed, so as to evenly distribute the load over the footings. As far as possible, columns shall be so designed as to have all parts of the column accessible after erection, for the purpose of cleaning and painting. In all buildings allowances shall be made for wind pressure which shall not be figured at less than thirty (30) pounds per square foot of elevation, where erected in open spaces or on wharves. In high buildings, erected in built-up districts, the wind pressure shall not be figured for less than twenty-five (25) pounds at tenth story, two and one-half (2½) pounds less on each succeeding lower story, and two and one-half (2½) pounds additional on each succeeding upper story to a maximum of thirty-five (35) pounds at fourteenth story and above. Wind bracing may be provided by making the connection joint between girders and columns sufficient for the vertical load as well as the bending due to side pressure; or brackets may be placed at this joint, proportioned for the side pressure; or diagonal bracing may be placed between columns, proportioned to transfer the shear of the side pressure to the footings. Where buildings are narrow and tall, so that the overturning due to wind is more than the down pressure of the unloaded building, the base of column must be anchored down to a sufficient foundation to counteract this upward strain. Cast iron columns shall be proportioned so that the loads coming upon them shall not produce strains greater than the allowable stresses hereinbefore mentioned; cast columns to have caps and bases truly square so as to give even bearing, and shall be bolted to each succeeding column; the lugs, caps and bases to be made of sufficient size to transmit the strains coming upon them. They shall be of tough gray iron, free from all cracks, blow-holes, etc., and concentric to outer circumference. In cast iron columns or inlets the least thickness allowable shall be three-fourth (¾) of an inch, and there shall be no variation in thickness, due to shifting of core, of more than twenty per centum. Cast iron columns shall not be of greater length than twenty times their least diameter. The Inspector may require columns drilled for inspection. All footings under columns shall be proportioned for the weight coming upon them, so as not to produce any greater pressure upon the earth beneath them, as hereinbefore mentioned. All foundations under columns shall be concentrically loaded, and where necessary shall have a slip joint connection with other masonry. Where beams are placed under columns to distribute the loads, they shall be proportioned as girders carrying uniform load, within the limits of the above mentioned allowable stresses. All structural steel and iron work to be thoroughly cleaned of rust and dirt and covered with two coats of an approved paint mixed in linseed oil; all parts of the structure, as far as possible, to be so designed as to be accessible for painting after erection. No curtain wall in buildings of skeleton construction shall be less than thirteen (13) inches in thickness for an average story height of twelve feet, and shall be so proportioned that a wind pressure of thirty pounds per square foot at any panel would not cause the wall to fall.

Section 44. Where the inclosing or division walls of a building are wholly or in part supported on iron or steel beams, girders and columns such beams, girders and columns shall be protected against the external changes of the atmosphere and against fire by a covering of brick, terra-cotta, fire clay, tile, or other approved fire-proofing, completely enveloping said structural members of iron or steel. Said fire-proofing around outside columns and beams if of brick, shall not be less than eight (8) inches; if of hollow tile, shall not be less than six (6) inches thick; and there shall be at least two sets of air spaces between the iron and steel members and the outside of the hollow tile covering. In all cases the brick or hollow tile shall be bedded in cement mortar close up to the iron

or steel members, and all joints shall be made full and solid. No building shall be deemed a fire-proof building unless, in addition to the above required covering of the iron or steel members, all the interior columns, beams and girders be enveloped in such fire-resisting materials as shall be approved by the Bureau of Building Inspection. The filling between the individual floor beams and girders shall be one of the fire-proof systems in use, as approved by the Bureau of Building Inspection, and must in every case have stood the test of three times the load for which the floor is designed, without sign of cracking. No wood or other inflammable material shall be used in any part of any such building except the doors and windows and their frames, the trims, the casings, the interior finish, when filled at the back with fire-proof materials; and the floor boards and sleepers directly under the spaces between and under the sleepers must be filled up and levelled off at the top of said sleepers with concrete or other incombustible material.

Section 45. Whenever the owner of any lot of ground is desirous of improving the same by the erection of a new building or buildings thereon, the Bureau of Building Inspection may permit the owner of such lot or the contractor for the erection of such building or buildings to put up a wooden shed on the same or neighboring lot for the use of the mechanics employed on said building or buildings while preparing their work: Provided, however, that such permission shall not extend to a longer time than until the building or buildings proposed to be erected shall be entirely finished, at which time the owner or contractor shall take down and remove the said shed.

Section 46. No frame bath-room projecting from the upper story of any dwelling house shall be erected within five feet of any similar construction composed wholly or partly of wood, unless the end of said bathroom facing such structure shall be covered with some fire-proof material, and in no case shall the distance dividing such structures be less than three feet, unless the ends shall have division walls of masonry not less than nine inches thick, built from the foundations of the buildings and carried up above the roof, as hereinbefore provided for party walls. It shall not be lawful to build a frame bathroom other than a projecting bathroom as provided for in this section, and no such bathroom shall be greater in area than sixty superficial feet. It shall not be lawful to build such bathroom unless the plumbing fixtures for bath purposes be placed therein.

Section 47. It shall only be lawful to erect frame sheds to be attached to dwellings as follows: The said shed shall not exceed twelve feet in height nor have any floor or loft between the ground floor and the roof, and must not connect with a frame bathroom projecting from an upper story; said sheds shall not be erected within five feet of any similar construction composed wholly or in part of wood, unless the side of said shed facing such structure shall be covered with fire-proof material, and in no case shall the distance dividing such structures be less than three feet, unless the ends shall have division walls of masonry not less than nine inches thick, built from the foundations of the building and carried up above the roof, as hereinbefore provided for party walls, or such other fire-proof materials as shall be approved by the Bureau of Building Inspection. The said shed may be open or inclosed, but in no case shall it be lathed or plastered or lined with wood so as to constitute a room to be occupied as a habitation. The roof of said shed must be covered with metal or other fire-proof material. No such shed shall extend to a greater distance than ten feet in a direct line from the rear wall to which it is attached. Councils may, by general ordinance, permit and regulate the erection of frame sheds on wharves, or elevators for the storage of grain, coal, lumber, and bay windows of incombustible material, but their mode of construction and location

shall be subject to the approval of the Bureau of Building Inspection. All permits granted for the erection of frame sheds may be revoked, and the shed shall be removed within thirty days after notice from the Director of Public Safety.

Section 48. No area shall extend more than one-fourth of the width of the pavement nor in any case more than three feet, measuring from the inside face of the area wall to the building line, and when areas are constructed on narrow streets the Inspector is to designate the distance from the building line, and every area shall be covered with a safe and substantial cover, the said cover in no case to extend above the grade of the sidewalk. All area and vault walls shall be constructed of brick or stone, and laid in cement mortar; the said walls shall be of sufficient thickness to resist lateral pressure.

Section 49. Every building hereafter erected or altered to be used as a theatre, opera house, or other building intended for theatrical or operatic purposes, or for public entertainments of any kind, where stage scenery and apparatus are employed, shall be built to comply with the requirements of this section; but all theatres or places of amusement now existing may be altered, providing such alteration does not amount to a virtual reconstruction thereof, so as to make it a new building. No building, which at the time of the passage of this act is not in actual use for theatrical or operatic purposes, and no building hereafter erected not in conformity with the requirements of this section, shall be used for theatrical or operatic purposes, or for public entertainments of any kind, where stage scenery and apparatus are employed, until the same shall have been made to conform to the requirements of this section; and no building hereinbefore described shall be opened to the public for theatrical or operatic purposes, or for public entertainments of any kind where stage scenery or apparatus are employed, until the Bureau of Building Inspection, and the Bureau of Fire, respectively, shall have approved the same in writing as conforming to the requirements of this section; and the mayors of the said cities shall refuse to issue any license for any such building and shall close the same and prevent its opening until a certificate in writing of such approval shall have been given by the Bureau of Building Inspection and the Bureau of Fire, respectively. Every such building shall have at least one front on the street, which front shall be as wide as the widest part of the auditorium or assembly hall, and in such front there shall be suitable means of entrance and exit for the audience, unless there shall also be a way or passage leading directly from the auditorium to another street, in which case the means of entrance and exit by such way or passage shall be taken into consideration to such extent as they shall furnish entrances and exits; and if they shall be of sufficient width to meet the requirements of this act, there need be no means of entrance or exit in front, saving by the side courts hereafter stipulated for. Any building located on a street, having a width thereon as wide as the widest part of the auditorium or assembly hall, shall be considered as having a front on said street, within the meaning of this act, if in addition thereto there shall be a way or passage leading from said theatre to another street, which way or passage shall be of a width not less than one-third of the width of the widest part of said auditorium or assembly hall. In addition to the aforesaid entrances and exits on the street, there shall be reserved for service in case of an emergency, an open court or space on the side not bordering on the street, where said building is located on a corner lot, and on both sides of said building, where there is but one frontage on the street. The width of such open court or courts shall be not less than seven feet, where the seating capacity is not over one thousand people; above one thousand and not more than eighteen hundred people, eight feet in width; and above eighteen hundred people, ten feet in width. Said

open court or courts, *if there be not, in addition to the front as aforesaid on one street, a way or passage of the width aforesaid leading into another street,* shall begin on a line with or near the proscenium wall, and shall extend the length of the auditorium proper to or near the wall separating the same from the entrance, lobby or vestibule and the said open court, or a separate and distinct corridor from each open court shall continue to the street through such super-structure as may be built on the street side of the auditorium, with continuous walls of brick or fire-proof materials, on each side of the entire length of said corridor or corridors, and the ceiling and floors, shall be fire-proof. *If there be, in addition to the front on a street, a way or passage of the width aforesaid leading into another street, then it will be sufficient if said open court or courts shall extend along the auditorium on each side thereof to said front, on said street, on which the theatre shall be located.* Said corridor or corridors shall not be reduced in width except by the thickness of the outer walls, and there shall be no projection in the same; the outer openings to be provided with doors or gates opening toward the street. During the performance the doors or gates in the corridors shall be kept open by proper fastenings; at other times they may be closed and fastened by movable bolts or locks. The said open courts and corridors shall not be used for storage purposes, or for any purpose whatsoever, except for exit and entrance from and to the auditorium and stage, and must be kept free and clear during performances. The level of said corridors at the front entrance to the building shall not be greater than one step above the level of the sidewalk where they begin at the street entrance, and the entrance of the main front of the building shall not be on a higher level from the sidewalk than four steps, unless approved by the Bureau of Building Inspection. To overcome any difference of level existing between exits from the parquet into courts and the level of the said corridors, gradients shall be employed of not over one foot in ten feet, with no perpendicular rise. From the auditorium, opening into the said open courts or on the side street, there shall not be less than two exits on each side in each tier from and including the parquet, and each and every gallery. Each exit shall be at least five feet in width in the clear and provided with doors of iron or wood; if of wood, the doors shall be constructed as hereinbefore in this bill described. All of said doors shall open outwardly and must be fastened with movable bolts, the bolts to be kept drawn during performances. There shall be balconies not less than four feet in width in the said open court or courts, at each level or tier above the parquet, on each side of the auditorium, of sufficient length to embrace the two exits; and from said balconies there shall be staircases extending to the ground level, with a rise of not over eight and one-half inches to a step, and not less than nine inches' tread, exclusive of the nosing. The staircase from the upper balcony to the next below shall not be less than thirty inches in width in the clear, and from the first balcony to the ground three feet in width in the clear where the seating capacity of the auditorium is for one thousand people or less, three feet six inches in the clear, where above one thousand and not more than eighteen hundred people, and four feet in the clear when above eighteen hundred people and not more than twenty-five hundred people, and not less than four feet six inches in the clear when above twenty-five hundred people. All the before mentioned balconies and staircases shall be constructed of iron throughout, including the floors, and of ample strength to sustain the load to be carried by them, and they shall be covered with a metal hood or awning, to be constructed as shall be directed by the Inspector of Buildings. If the said balconies be carried to and connect with an inclosed tower stairway, having its exit directly to the street, the open courts or corridors hereinbefore described may have deducted from their width the width of the

staircases herein called for. Where one side of the building borders on a street, there shall be balconies and staircases of like capacity and kind as before mentioned, carried to the ground. *Any portion or portions of the premises bordering on a main street, not required for the uses of the theatre, may be used for offices, stores, or rooms for similar purposes; Provided, the walls, ceilings and floors separating such portion or portions from the theatre proper are built or constructed of such fire-proof material as shall be approved by the Bureau of Building Inspection and the Fire Marshal; and that the portion or portions so used for offices, stores or rooms for similar purposes shall be of first-class construction and shall have no openings connecting such offices, stores, or rooms for similar purposes with the theatre proper; And also that a fireproof exit is provided from the theatre on each tier equal to the combined width of exits opening on opposite sides in each tier communicating with balconies and staircases leading to the street, and in a manner provided elsewhere in this section.* Said exit passages shall be entirely cut off by brick walls from said offices, stores or apartments, and the floors and ceilings in each tier shall be fire-proof. Nothing herein contained shall prevent a roof garden, art gallery or rooms for a similar purpose being placed over a theatre or public building, provided the floor of the same forming the roof over such theatre or building shall be constructed of iron or steel and fire-proof materials, and that said floor shall have no covering boards or sleepers of wood, but be of tile or cement. Every roof over said garden or rooms shall have all supports and rafters of iron or steel, and be covered with glass or fire-proof materials, or both; but no such roof garden, art gallery or room for any public purpose shall be placed over or above that portion of any theatre or other building which is used as a stage. No workshops, storage or general property room shall be allowed above the auditorium or stage or under the same, or in any of the fly galleries. All of said rooms or shops may be located in the rear or at the side of the stage, but in such cases they shall be separated from the stage by a brick wall, and the openings leading into said portions shall have fire-proof doors on each side of the openings, hung to iron eyes built into the wall. No portion of any building hereafter erected or altered, used or intended to be used, for theatrical or other purposes as in this section specified, shall be used or occupied as a hotel, boarding or lodging house, factory, workshop or manufactory, or for storage purposes, except as may be hereafter specifically provided for. Said restriction relates not only to that portion of the building which contains the auditorium and the stage, but applies also to the entire structure in connection therewith. No store or room contained in the building, or the offices, stores or apartments adjoining, as aforesaid, shall be let or used for carrying on any business dealings in articles designated as specifically hazardous in the classification in the Board of Fire Underwriters, or for manufacturing purposes. No lodging accommodation shall be allowed in any part of the building communicating with the auditorium. Interior walls built of fire-proof materials shall separate the auditorium from the entrance vestibule and from any room or rooms of the same, also from any lobbies, corridors, refreshment or other rooms. All staircases for the use of the audience shall be inclosed with walls of brick or fire-proof materials, approved by the Bureau of Building Inspection, in the stories through which they pass, and the openings to said staircases from each tier shall be the full width of said staircase. A fire wall of brick shall separate the auditorium from the stage, and the same shall extend at least four feet above the stage roof, or the auditorium roof, if the latter be higher, and shall be coped. Above the proscenium openings there shall be an iron girder covered with fire-proof materials to protect it from the heat. There shall also be constructed a relieving arch over the same, the intervening space being filled in with

hard-burnt brick of the full thickness of the proscenium wall. Should there be constructed an orchestra over the stage above the proscenium opening, the said orchestra shall be placed on the auditorium side of the proscenium fire wall, and shall be entered only from the auditorium side of said wall. The moulded frame around the proscenium opening shall be formed entirely of fire-proof materials; if metal be used, the metal shall be filled in solid with non-combustible material, and securely anchored to the wall with iron. The proscenium opening shall be provided with fire-proof metal curtain or a curtain of asbestos or similar fire-proof material, approved by the Bureau of Building Inspection, sliding at each end within iron grooves securely fastened to the brick wall and extending into such grooves not less than six inches on each side. Said fire-proof curtain shall be raised at the commencement of each performance and lowered at the close of said performance, and be operated by approved machinery for that purpose. The proscenium curtains shall be placed at least three feet distant from the footlights at the nearest point. There shall be no opening through proscenium wall, except the curtain opening, and not more than two others, which shall be located at or below the level of the stage. These latter openings shall not exceed twenty-one superficial feet each, which shall have doors of iron or wood in each face of the wall; if of wood, the door shall be lined with tin, and securely hung to rabbeted iron frames or rabbets in the brick work. They shall be hung so as to be opened from either side at all times. Direct access to these doors shall be provided on both sides, and the same shall always be kept free from any incumbrance. Iron ladders or stairs securely fixed to the wall, on the stage side, shall be provided, to overcome any difference of level existing between the floor or galleries on the stage side of the fire wall and those on the other side of the auditorium. There shall be provided over the stage, metal skylights of an area, or a combined area, of at least one-eighth of the area of the said stage, fitted up with sliding sash and glazed with double thick sheet glass, not exceeding one-eighth of an inch thick; and each pane thereof measuring not less than three hundred square inches, and the whole of which skylights shall be constructed so as to open instantly on the cutting or burning of a hempen cord, which shall be arranged to hold said skylights closed, or some other equally simple approved device for opening them may be provided. There shall be provided immediately under the glass of said skylight a wire netting, or the skylight may be glazed with wire-glass. All that portion of the stage not comprised in the working of scenery, traps and other mechanical apparatus for the presentation of a scene, usually equal to the width of the proscenium opening, shall be built of iron or steel beams, filled in between with fire-proof materials, and all girders for the support of said beams shall be wrought-iron or rolled steel. The fly galleries entire, including pin-rails, shall be constructed of iron or steel, and the floor of said galleries shall be composed of iron or steel beams, filled with fire-proof materials, and no wood boards or sleepers shall be used as a covering over beams, but the said floor shall be entirely fire-proof. The rigging loft shall be fire-proof, except the floor covering the same. All stage scenery, curtains and decorations made of combustible material, and all woodwork on or about the stage shall be saturated with some non-combustible material, or otherwise rendered safe against fire to the satisfaction of the Bureau of Fire; and all such stage scenery shall be raised and lowered without the use of counter weights, unless such counter weights are so situated that they operate against the wall and do not overhang the stage. The roof over the auditorium, and the entire main floor of the auditorium and vestibule, also the entire floor of the second story of

the front superstructure over the entrance, lobby and corridors, and all galleries in the auditorium, shall be constructed of iron or steel and fire-proof materials, not excluding the use of wooden floor boards and necessary sleepers to fasten the same to, but such sleepers shall not mean timbers of support. The front of each gallery shall be formed of fire-proof materials, excepting the capping, which may be made of wood. The ceiling under each gallery shall be entirely formed of fire-proof materials. The ceiling of the auditorium shall be formed of fire-proof materials. All lathing, wherever used, shall be of metal. The partition in that portion of the building which contains the auditorium, the entrance, vestibule and every room and passage devoted to the use of the audience, shall be constructed of fire-proof materials including the furring of outside or other wall. None of the walls or ceilings shall be covered with wood sheathing, canvas or any other combustible material, but this shall not exclude the use of wood wainscoting to a height not to exceed six feet, which shall be filled in solid between the wainscoting and the wall with fire-proof materials. The wall separating the actors' dressing-rooms from the stage, and the partitions of every passageway from the same to the stage, and all other partitions on or about the stage shall be constructed of fire-proof material, approved by the Bureau of Building Inspection. All doors in any of said partitions shall be of iron or of wood, constructed as hereinbefore described. All the shelving and cupboards in each and every dressing room, property room or other storage rooms shall be constructed of metal, slate or some fire-proof material. Dressing rooms may be placed in the fly galleries: Provided, That proper exits are secured therefrom to the fire escapes in the open courts, and that the partitions and other matters pertaining to dressing rooms shall conform to the requirements herein contained, but the stairs leading to the same shall be fire proof. All seats in the auditorium, excepting those contained in the boxes, shall be firmly secured to the floor, and no seat in the auditorium shall have more than six seats intervening between it and an aisle on either side, and no stool or seats shall be placed in any aisle. All platforms in galleries formed to receive the seats shall not be more than twenty-one inches in height of riser, nor less than thirty inches in width of platform. All aisles on the respective floors in the auditorium having seats on both sides of same shall not be less than three feet wide where they begin, and shall be increased in width towards the exits in the ratio of one and one-half inch to five running feet. Aisles having seats on one side only shall not be less than two feet wide at their beginning and increased in width the same as aisles having seats on both sides. The aggregate capacity of the foyers, lobbies, corridors, passages and rooms for the use of the audience, not including aisle space between seats, shall on each floor gallery be sufficient to contain the entire number to be accommodated on said floor or gallery, in the ratio of one hundred and fifty superficial feet of floor room for every one hundred persons. Gradients or inclined planes shall be employed instead of steps, where possible, to overcome slight difference of level in or between aisles, corridors and passages. Every theatre accommodating three hundred persons shall have at least two exits. When accommodating five hundred persons, at least three exits shall be provided; these exits not referring to or including the exits to the open court at the sides of the theatre. Doorways of exit or entrance for the use of the public shall not be less than five feet in width, and for every additional one hundred persons, or portion thereof, to be accommodated in excess of five hundred, an aggregate of twenty inches additional exit width must be allowed. *These doorways of exit and of entrance may be in the said front altogether, or in the case of a theatre having also an exit and entrance directly to and from another street, through a way or passage covered or otherwise, the width of one-third of that of the widest part*

of the auditorium or assembly hall, some of the said doorways may be made therein to such extent as said entrance or passage will accommodate the same. All doors of exit or entrance shall open outwardly, and be hung to swing in such manner as not to become an obstruction in passage or corridor, and no such doors shall be closed and locked during any representation or when the building is open to the public. Distinct and separate places of exit and entrance shall be provided for each gallery above the first. A common place of exit and entrance may serve for the main floor of the auditorium and the first gallery, provided its capacity be equal to the aggregate capacity of the outlets from the main floor and said gallery. No passage leading to any stairway, communicating with any entrance or exit, shall be less than four feet in width in any part thereof. All stairs within the building shall be constructed of fire-proof material throughout. Stairways serving for the exit of fifty people must, if straight be at least four feet wide between railing or between walls, and if curved or winding, five feet wide, and for every additional fifty people to be accommodated six inches must be added to their width. In no case shall the risers of any stairs exceed seven and one-half inches in height, nor shall the treads, exclusive of the nosings, be less than ten and one-half inches wide in straight stairs. In circular or winding stairs, the width of the treads at the narrowest end shall not be less than seven inches. Where the seating capacity is for more than one thousand people, there shall be at least two independent staircases, with direct exterior outlets provided for each gallery in the auditorium, were there are not more than two galleries, and the same shall be located on opposite sides of said gallery. Where there are more than two galleries, one or more additional staircases shall be provided, the outlets from which shall communicate directly with the principal exit or other exterior outlets. All said staircases shall be of width proportioned to the seating capacity, as elsewhere herein described. Where the seating capacity is for one thousand people or less, two direct lines of staircases only shall be required, located on opposite sides of the galleries, and in both cases shall extend from the sidewalk level to the upper gallery, with outlets for each gallery to each of said staircases. At least two independent staircases, with direct exterior outlets, shall also be provided for the service of the stage and shall be located on the opposite side of the same. All inside stairways leading to the upper galleries of the auditorium shall be inclosed on both sides with walls of fire-proof materials. Stairs leading to the first or lower galleries may be left open on one side, in which case they must be constructed as herein provided for similar stairs leading from the entrance hall to the main floor of the auditorium; but in no case shall stairs leading to any gallery be left open on both sides. When straight stairs return directly on themselves, a landing of the full width of both flights, without any steps, shall be provided. Stairs turning at an angle shall have a proper landing, without winders, introduced at said turn. In stairs when two side flights connect with one main flight no winders shall be introduced, and the width of the main flight shall be at least equal to the aggregate width of the side flights. Circular or winding stairs shall have proper landings introduced at convenient distances. All inclosed staircases shall have on both sides strong handrails firmly secured in the wall, about three inches therefrom, and about three feet above the stairs, but said handrails shall not run on level platforms and landings where the same is more in length than the width of the stairs. All staircases six feet and over in width shall be provided with a centre handrail of hard wood or metal, not less than two inches in diameter, placed at a height of about three feet above the centre of the treads, and supported on wrought iron or brass standards of sufficient strength, placed not farther than four feet apart, and securely bolted to the treads or risers

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of stairs, or both, and at the head of each flight of stairs, on each landing, the post or standard shall be at least six feet in height, to which the rail shall be secured. Every steam boiler which may be required for heating or other purposes, shall be located outside the building, and the space allotted to the same shall be inclosed by walls of masonry on all sides, and the ceiling of such space shall be constructed of fire-proof material. All doorways in said wall shall have iron doors. No floor register for heating shall be permitted. No coil or radiator shall be placed in any aisle or passageway used as an exit where it forms an obstruction, but all said coils and radiators shall be placed in recesses formed in the wall or partition to receive the same. All supply, return or exhaust pipes shall be properly encased and protected where passing through floors or near woodwork. Standpipes of two and one-half inches in diameter shall be provided, with hose attachments, on every floor and gallery as follows, namely: One on each side of the auditorium in each tier, also one on each side of the stage in each tier, and at least one in the property room, and one in the carpenter shop, if the same be contiguous to the building. All such standpipes shall be kept clear from obstruction. Said standpipes shall be separate and distinct, receiving their supply of water from the steam pump, and shall be fitted with the regulation couplings of the fire department, and shall be kept constantly filled with water by means of an automatic steam pump or pumps of sufficient capacity to supply all the lines of hose when operated simultaneously, and the said pump or pumps shall be supplied from the street main, and be ready for immediate use at all times during a performance in said building. A separate and distinct system of automatic sprinklers, with fusible plugs, approved by the Bureau of Fire, supplied with water from a tank located on the roof of the stage, and not connected in any manner with the standpipe, shall be placed up and around the proscenium opening and on the ceiling or roof over the stage, at such intervals as will protect every square foot of stage surface when said sprinklers are in operation. Automatic sprinklers shall also be placed wherever practicable under the stage and in the carpenter's shop, paint room, store rooms and property rooms. A proper and sufficient quantity of two and one-half inch hose, fitted with the regulation couplings of the fire department, and with nozzles attached thereto, and with hose spanners at each outlet, shall always be kept attached to each hose attachment. There shall also be kept in readiness for immediate use on the stage at least four casks full of water and two buckets to each cask. Said casks and buckets shall be painted red. There shall also be provided hand pumps or other portable fire extinguishing apparatus, and at least four axes and two twenty five-foot hooks, two fifteen foot hooks, and two ten foot hooks, on each tier or floor of the stage. Every portion of the building devoted to the uses or accommodation of the public, also all outlets leading to the streets and including the open courts and corridors, shall be well and properly lighted during every performance, and the same shall remain lighted until the entire audience has left the premises. At least two or more oil lamps, on each side of the auditorium in each tier, shall be provided on fixed brackets, not less than seven feet above the floor. Said lamps shall be filled with whale or lard oil, and shall be kept lighted during each performance, or in place of said lamps, candles shall be provided.

All gas or electric lights in the halls, corridors, lobby, or any other part of the said buildings used by the audience, except the auditorium, must be controlled by a separate shut-off, located in the lobby, and controlled only in that particular place. Gas mains supplying the building shall have independent connections for the auditorium and the stage, and provisions shall be made for shutting off the gas from the outside of the building. When the interior gas lights are not lighted by electricity, other suitable appliances, approved by the Bureau of Fire, shall be provided. All suspended or bracket lights surrounded by glass, in the auditorium, or in any part of the building devoted to the public, shall be provided with proper wire netting underneath. No gas or electric light shall be inserted in the walls, woodwork, ceilings, or in any part of the building unless protected with fire-proof materials. All lights in passages and corridors in said building, and wherever deemed necessary by the Bureau of Fire, shall be protected by proper wire net work. The footlights, in addition to the wire network, shall be protected by strong wire guard, not less than two feet distant from said footlights, and the trough containing said footlights shall be formed of and surrounded by fire-proof materials. All stage lights shall be incandescent electric lights, where the current can be obtained, and shall be constructed according to the best known methods and subject to the approval of the Bureau of Fire, and shall be suspended for ten feet by wire rope. All ducts or shafts used for conducting heated air from the main chandelier, or from any other light or lights shall be constructed of metal and made double, with an air space between. All stage lights shall have strong metal wire guards or screens, not less than ten inches in diameter, so constructed that any material in contact therewith shall be out of reach of the flames of said stage lights, and must be soldered to the fixtures in all cases. The standpipes, gas pipes, electric wires, hose, footlights and all apparatus for extinguishing of fire or guarding against same, as in this section specified, shall be in charge and under the control of the Bureau of Fire, Department of Public Safety; and said Department is hereby directed to see that the arrangements in respect thereto are carried out and enforced, and Councils may, by ordinance, fix a reasonable compensation for such services. A diagram or plan of each tier, gallery, or floor, showing distinctly the exits therefrom, shall be printed in a legible manner on the program of the performance. Every exit shall have over the same, on the inside the word "EXIT," painted in legible letters not less than eight inches high. It shall be within the power of the Mayor, after full report from the Department of Public Safety, to cause the closing up of any theatre, opera house, or public hall, where, in the judgment of the Mayor and the Department of Public Safety, the ingress and egress are not reasonably safe for the safe and speedy exit of the audience in case of fire or panic.

Section 50. The cities of the first class may, by ordinance, regulate and determine the license fee for the permits as required by the provisions of this act; the said fees to be paid by them into the city treasury in the manner and form as is now provided by law. The said cities may, by general ordinance, limit the height of buildings, and regulate the management and inspection of elevator hoistways and elevator shafts in said cities.

Section 51. In the event of failure to obtain a permit, or in any case of final decision, either of an Inspector or of the Bureau, or of an examining commission, such decision or order or certificate, that no permit has been issued, may be at once, if not complied with, certified to any court of common pleas, which shall upon application of such bill of complaint, duly verified by affidavit, either of the Director of Public Safety, the Chief of the Bureau of Building Inspection, or any Inspector thereof, or of any member of an examining commission, issue a mandatory injunction requir-

ing compliance with such order or decision within five days, or within a shorter time if the relief sought is the removal of a dangerous wall, ceiling or structure, and the court sees proper to fix a shorter time; that all petitions, bills or complaints to compel compliance with the provisions of this act shall be given priority over other business or cases by any court of common pleas to which the final decision of an Inspector, the Bureau of Building Inspection, or of an examining commission appointed by the Director of Public Safety, shall be certified. If said injunction is not complied with within the time specified by the court, or if it cannot for any reason be served, the court shall have power to enforce its order by attachments or to issue an order to any sheriff, commanding him to remove the wall, building or structure condemned by the building inspectors (either as contrary to the provisions of this act or as dangerous), under the supervision of the Bureau of Building Inspection or such Inspector as the Chief of the Bureau shall designate. The sheriff shall have power to employ such competent builders, riggers and workmen as shall be necessary to carry out the order of the court. He shall certify to the court when he has performed the work required to be done, the cost incurred, and such bill being approved by the court and not being paid by the owner of the premises, the court shall have power by mandamus execution to compel the city to pay such cost. The court shall upon the issuing of such mandamus execution, direct that the prothonotary of the court shall enter the amount thereof as a lien against the premises, whereon the order was enforced and the costs incurred, and the city paying such costs may thereafter proceed in the case, wherein the order was made to collect such bill of costs and the proper docketed costs thereon, by the same process and proceedings and under the same restrictions as are now provided for or required by law for the collection of claims for the removal of nuisances in said cities, and said lien shall not be discharged by any judicial sale until paid; and the said city paying such costs may also, by action of assumpsit, recover the same from the owner or owners of the said premises.

Section 52. Any person or persons, firms or corporations, whether owner, builder, contractor, architect or workman, who shall make any alteration, construction or removal of any building or structure whatsoever, without permit therefor first issued, or in violation of any of the provisions of this act, or who shall have become the owner thereof after the same has been done, and who shall omit, neglect, or refuse to remove the same, if dangerous or in violation of this act, or to make the same safe and secure and in all respects conform to the requirements of this act within thirty (30) days after notice to that effect, shall forfeit and pay for each offence the sum of seventy-five (75) dollars, and the further sum of fifty (50) dollars for every period of one month for which the said person or persons shall omit, neglect or refuse to remove the same, or make it comply with this act after the expiration of the notice aforesaid; and any person or persons, firm or corporation, who shall contract for the erection or construction of any building or other thing in violation of any of the provisions of this act, shall be subject to a penalty of fifty (50) dollars. All of the aforesaid penalties to be recovered as penalties of equal amount are or shall be recoverable, in the name and for the use of the city, and when collected shall be paid into the treasury thereof.

Section 53. All acts or parts of acts inconsistent herewith, or supplied hereby, be and the same are hereby repealed.

Approved—the 5th day of May, A. D. 1899.

WILLIAM A. STONE

Note:—Section 49, as printed above, is Supplemental Act No. 241, approved by Governor Stone the 5th day of June, A. D. 1901, and takes the place of original section 49 of the act of May 5th, 1899.

No. 171.

AN ACT

To further amend section forty-nine of an act, approved the fifth day of May, one thousand eight hundred and ninety-nine (Pamphlet Laws, one hundred and ninety-three), entitled "An act to create a Bureau of Building Inspection, and to regulate the construction, maintenance, and inspection of buildings and party walls in cities of the first class."

Section 1. Be it enacted, &c., That so much of section forty-nine of an act, approved the fifth day of May, one thousand eight hundred and ninety-nine (Pamphlet Laws, one hundred and ninety-three), entitled "An act to create a Bureau of Building Inspection, and to regulate the construction, maintenance, and inspection of buildings and party walls in cities of the first class," which, as amended by an act, approved the fifth day of June, one thousand nine hundred and one (Pamphlet Laws, four hundred and sixty-nine), entitled "An act supplemental to an act, entitled 'An act to create a Bureau of Building Inspection and to regulate the construction, maintenance, and inspection of buildings and party walls in cities of the first class,' approved the fifth day of May, one thousand eight hundred and ninety-nine," reads as follows:

"*When located on a corner lot, that portion* of the premises bordering on *the side* street *and* not required for the uses of the theatre may *if such portion be not more than twenty feet in width,* be used for offices, stores, or *apartments,* provided the walls separating *this* portion of the theatre proper *are carried up solidly to and through the roof,* and that a fire-proof exit is provided from the theatre on each tier equal to the combined width of exits opening on opposite sides in each tier communicating with balconies and staircases leading to the street, in a manner provided elsewhere in this section," be, and the same is hereby, amended to read as follows:

Any portion or portions of the premises bordering on *a main* street, not required for the uses of the theatre may be used for offices, stores, or *rooms for similar purposes:* Provided, The walls, *ceilings, and floors* separating *such* portion *or portions from* the theatre proper are *built or constructed of such fire-proof material as shall be approved by the Bureau of Building Inspection and the Fire Marshal, and that the portion or portions so used for offices, stores, or rooms for similar purposes shall be of first-class construction, and shall have no openings connecting such offices, stores or rooms for similar purposes with the theatre proper.* And *also* that a fire-proof exit is provided from the theatre on each tier equal to the combined width of exits opening on opposite sides in each tier communicating, with balconies and staircases leading to the street, in a manner provided elsewhere in this section.

Approved—The 5th day of May, A. D. 1921.

WM. C. SPROUL

The foregoing is a true and correct copy of the Act of the General Assembly No. 171.

CYRUS E. WOODS
Secretary of the Commonwealth

No. 236

AN ACT

To further regulate the construction, maintenance and inspection of buildings and party walls, in cities of the first class.

Section 1. Be it enacted, &c., That all buildings hereafter erected or altered, in cities of the first class, shall be classified as follows:

Buildings of the first class shall include all buildings in which the walls, floors, columns, girders, beams, partitions, and roofs are of stone, brick, terra-cotta, concrete, steel, iron, or such other fire proof materials as shall be approved by the Bureau of Building Inspection.

Buildings of the second class shall include all buildings the walls of which are as hereinbefore specified for buildings of the first class, but in which the floors, columns, beams and girders are of the construction known as "slow-burning construction," in which all columns and girders shall be of wood, and in which no column shall be of less dimension than sixty-four square inches, and no girder or floor-beams less than six inches in its least dimension. The flooring to be of plank not less than two and three-quarters inches thick, when dressed, and the roof of plank not less than one and three-quarters inches thick, when dressed: Provided, That in such buildings, iron or steel may be used for beams, columns or girders, if the same be protected with fire-proofing materials, as hereinafter set forth for buildings of the first class.

Buildings of the third class shall include all buildings the walls of which are as hereinbefore specified for buildings of the first class, but which in their interior construction are not in accordance with the requirements as hereinbefore set forth for buildings of the first and second class, or the floors of which may be of ordinary house or joist construction.

Buildings of the fourth class shall include all buildings, other than those of the character specified for first, second and third class construction.

Section 2. Any building hereafter erected or altered, to be used as a hospital, asylum, or institution for the care or treatment of persons, the height of which exceeds two stories, and every building hereafter erected or altered, to be used as an apartment house, tenement house, flat house, lodging house, hotel, school, or police station, the height of which exceeds four stories, shall be a building of the first class; and no building of any kind, except as hereafter provided, shall be erected or raised to a height exceeding sixty-five feet, except the same be a building of the first or second class; and no building shall be erected or raised to a height exceeding eighty-five feet, except the same be a building of the first class; and all buildings of a height exceeding six stories shall be buildings of the first class.

All buildings of the first class hereafter erected or altered, to be used for warehouse, store or factory purposes, shall be so divided by fire-proof walls or partitions on every floor, except as hereinafter provided, that no space on any floor, not so divided, shall exceed twenty-five thousand square feet; and no existing wall or partition, in any of such building, shall be removed so as to leave a space, not so divided, of more than twenty-five thousand square feet. Such walls or partitions shall extend from the fire-proof construction of the floors to the fire-proof beam filling of the ceilings. The openings or doorways in any such walls or partitions shall not exceed three in number for each floor, for each such wall or partition, and no such opening shall exceed ten feet in height or ten feet in width. Each opening must be provided with two sets of standard fire-doors, separated by the thickness of the wall or partition, said doors to be constructed and hung as provided elsewhere in this act. All of the said openings through parti-

tions of fire-proof material shall have metal frames or studs, securely fastened to floor and ceiling, and such metal studs shall be covered with such fire resisting materials as shall be approved by the Bureau of Building Inspection. No wood for framing or fastening shall be used for such openings: Provided, however, That the space or spaces, of the first or grade floor of any such buildings, may exceed twenty-five thousand square feet, when the entire building is under the protection of an approved system of automatic sprinklers, so long as such system shall be kept and maintained in complete working order. If such system shall not be maintained and kept in such order, it shall be the duty of the Bureau of Building Inspection to give written notice to the tenants or owners, served upon the premises, of said fact, and within sixty days thereafter the division by fire-proof walls or partitions, as above provided, shall be made, and thereafter maintained.

No building shall be deemed a building of the first class unless the enclosing or division walls are wholly or in part supported on iron or steel beams, girders and columns, such beams, girders and columns shall be protected against the external changes of the atmosphere and against fire by a covering of brick, terra-cotta, fire-clay, tile or other approved fire-proofing, completely enveloping said structural members of iron or steel. Said fire-proofing around outside columns and beams, if of brick, shall not be less than eight inches; if of hollow tile, shall not be less than six inches thick, and there shall be at least two sets of air spaces between the iron and steel members and the outside of the hollow tile covering. In all cases the brick or hollow tile shall be bedded in cement mortar close up to the iron or steel members, and all joints shall be made full and solid. No building shall be deemed a fire-proof building unless, in addition to the above required covering of the iron and steel members, all the interior columns, beams and girders be enveloped in such fire-resisting materials as shall be approved by the Bureau of Building Inspection. The filling between the individual floor beams and girders shall be one of the fire-proof systems in use, as approved by the Bureau of Building Inspection, and must in every case have stood the test of three times the load for which the floor is designed, without sign of cracking. No wood or other inflammable material shall be used in any part of any such building except the doors and windows and their frames, the trims, the casings, the interior finish, when filled at the back with fire-proof materials; and the floor boards and sleepers directly under the spaces between and under the sleepers must be filled up and leveled off at the top of the said sleepers with concrete or other incombustible material. All interior columns, and the lower flanges of all girders of iron or steel, shall be protected with at least three inches of brick, terra-cotta, concrete, or other fire-resisting materials, as shall be approved by the Bureau of Building Inspection. The web of all girders, and the flanges and web of all beams, to be protected by not less than two inches of terra-cotta, brick, concrete, or other fire-proof material; but the extreme outer edge of lugs, brackets, and similar supporting metal, may project within one inch of the surface of the fire-proofing. Where the bases of iron or steel columns are independent, the said bases shall be either cast-steel, thoroughly annealed, or built-steel bolsters. Built sections of girders or columns, in which all parts are not accessible after erection, shall be filled with concrete, in the proportion of one part of Portland cement to three parts of sand and five parts of stone, to pass a three-fourths of an inch mesh. The maximum span for arches of brick, terra-cotta, concrete, or other patent floors, shall not exceed eight feet; but nothing herein contained shall prohibit the use of reinforced concrete or heterogenous systems, provided the depth of the floor beams or girders is three-fifths of an inch per foot of span, and that a test for strength, and fire and water resistance, satisfactory to the Bureau of Building Inspection, shall be given

for said reinforced or heterogenous system. No arch in any floor system shall have a rise of less than one and one-quarter inch per foot of span.

In buildings of the first class, all pipes, conduits, mains, wiring and conveyances for conducting heat, light or water, shall be encased in separate fire-proof ducts, and shall not be enclosed in the fire-proofing surrounding any column, girder or beam of steel or iron.

Provided, also, That this section shall not apply to one-story buildings, used only for working in non-combustible materials, and that nothing contained in this section shall prevent the erection of grain elevators, church spires, towers for observation purposes, and structures for similar uses, all of which structures shall be constructed in such manner and under such conditions as may be prescribed by the Bureau of Building Inspection.

Section 3. Buildings of the second class, in which any floor area between exterior walls exceeds fifteen thousand square feet, and buildings of the third class in which any floor area between exterior walls exceeds five thousand square feet, shall be so divided by walls of brick, stone, concrete, or such other fire-resisting material as shall be approved by the Bureau of Building Inspection, that no space inside such building shall exceed fifteen thousand or five thousand square feet, respectively, as hereinbefore set forth; the said walls to be of the thickness as now required by law, and shall extend through, and at least three feet above the roof. No existing wall in any buildings of the second or third class shall be removed, so as to leave a space inside any building which shall exceed the areas hereinbefore set forth for each class.

Provided, however, That in buildings of the third class, the floor area may be seventy-five hundred square feet, if the floors and roof be made of plank not less than one and three-quarters inches thick, when dressed.

Openings may be made in such division walls, of the size, number and character as provided in section two for buildings of the first class, if protected by standard fire-doors as provided in that section.

Provided further, That this section shall not apply to private dwellings, nor to one-story buildings used only for working in non-combustible materials.

In buildings other than buildings of the first class, skeleton wall construction shall not be permitted.

All party walls in buildings of the first, second and third class, except dwellings and buildings of similar light construction, shall extend through, and at least three feet above, the roof.

Section 4. All stairways hereafter placed in any buildings of the first, second or third class, used for warehouse, store or factory purposes, and in which any floor area between exterior walls exceeds five thousand square feet, and all elevators, hoistways, hatchways, well-holes, chutes, dumb-waiters and interior light or vent shafts, or shafts of any description, hereafter placed in any building, except such fire-proof buildings as are occupied for office purposes only, shall be enclosed, between floors and ceilings of each story, in suitable walls of brick, or with a suitable framework of iron and burnt clay filling, or of such other fire-proof material and form of construction as may be approved by the Bureau of Building Inspection, except that the enclosure walls, required by this section, in any non-fire-proof buildings, used as warehouses or factories, shall be of brick. All such walls or construction, where the elevator, stairs, hoist, hatchway, chute, dumb-waiter, light or vent shaft, or other shaft, extends to the top floor, shall extend through, and at least three feet above, the roof. If the enclosure walls are of brick, any of the above shafts may be in the same enclosure, provided the stairways are constructed of non-combustible material. All interior openings in the enclosure walls of elevators, stairways, hoistways, hatchways, chutes and dumb waiters, shall be pro-

vided with fire-proof doors, made solid for their full height, and set in fire-proof frames and fittings. Lights of wire-glass, in metal frames, may be placed in such doors and in the enclosure walls, but no one pane of wire-glass shall exceed in area two hundred and fifty square inches, between muntins. All exterior openings in the enclosure walls of stairways, elevators or dumb waiters, and all openings in the walls of interior light or vent shafts, shall be provided with approved wire-glass windows, set in approved metal frames, but no one pane of wire-glass in such windows shall be larger than twenty-four inches by thirty inches, between muntins. Automatic closing trap-doors, tin lined on the under side, at each floor, when approved by the Bureau of Building Inspection, may be substituted for the above named enclosure walls for hoistways (without cars), hatchways and chutes.

The roofs over the enclosed elevators, stairways, hoistways, hatchways, chutes and dumb waiters, shall be made of fire-proof materials, with a skylight or side-lights above the roof, at least three-quarters the area of the shaft, made of glass set in iron frames. When the shafts do not extend to the ground, the bottom floor of the shaft shall be constructed of fire-proof material. In all buildings of the first, second or third class, in which any floor area between exterior walls is five thousand square feet or less, the stairways shall be of such number, and protected in such manner, as may be approved by the Bureau of Building Inspection.

In any building now existing, in which there is an elevator, dumb-waiter, interior light or vent shaft, hoistway, hatchway, chute, well-hole, or shaft of any description not enclosed in walls constructed and arranged as required in this act, the openings thereof, through and upon each floor of said building, shall be provided with and protected by a substantial guard or vertical enclosure, and gate or gates, or with such good and sufficient trap-doors, or both, as may be directed and approved by the Bureau of Building Inspection. Such guards or enclosure gates shall be kept closed at all times when not in actual use, and trap-doors shall be closed at the close of the business of each day, by the occupant or occupants of the building having the use or control of the same. When in the opinion of the Chief of the Bureau of Building Inspection automatic closing trap-doors are required for any such floor openings, the same shall be tin lined on the under side, and constructed so as to form a substantial floor surface, when closed, and so arranged for elevators as to open and close by the action of the elevator in its passage, ascending or descending.

Provided, however, that in every building, now or hereafter used or occupied as a hotel, lodging house, apartment or tenement house, store, warehouse or factory, or where a number of persons are employed, or which is used for public assemblage, in which there is any elevator, hoistway, hatchway, well-hole, chute or dumb waiter, enclosed in walls constructed of combustible material, the enclosing walls of such elevators, hoistways, hatchways, well-holes, chutes, and dumb waiters, shall either be lined with metal, securely fastened on the inside of the shaft, or such elevators, hoistways, hatchways, well-holes, chutes and dumb waiters, shall be enclosed in suitable walls, constructed and arranged as required for elevator shafts in this act: Provided, however, That approved automatic closing trap-doors, tin lined on the under side, and so constructed as to form a substantial floor surface when closed, and so arranged for elevators as to open and close by the action of the elevator in its passage, either ascending or descending, may be substituted for such metal lining, when in the opinion of the Chief of the Bureau of Building Inspection such trap-doors will provide the required protection.

In existing buildings, passenger elevators, enclosed in open grill work, may be erected in staircase enclosures, where the entire space occupied by the stairs and elevators is enclosed in brick or stone walls, or walls of such

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other fire-proof material and form of construction as may be approved by the Bureau of Building Inspection; provided that, in warehouses, stores, or factories, all openings in the enclosing walls must be provided with fire-proof doors, or wire-glass in metal frames, as provided elsewhere in this section for elevator and stairway enclosures.

Provided, however, That nothing in this section shall apply to any building not over two stories in height, nor to private dwellings and buildings of similar light construction, stores with private dwelling occupancy entirely above the grade floor, and stables.

Section 5. Whenever standard fire-doors or fire-shutters are referred to in this act, they shall be constructed as follows, namely: Not less than two thicknesses of one-inch boards, laid diagonally, and securely fastened together by wrought-iron clinched nails, and covered with I C tin-plates, not exceeding fourteen by twenty inches, joints to be locked one-half inch and nailed under seams, and corners to have mitre-fold (not mitre-joint). Doors and shutters to overlap sides and top of opening four inches, and to close tight against smooth masonry (not wood trimmed) and sill. Sills to be of non-combustible material, resting on and built into brick or stone wall, and extending under and beyond outer surface of door. Doors and shutters to be hung on wrought-iron wall-eyes, or to slide on track of heavy flat-rolled steel. All hardware, such as hinges, hangers, wall-eyes, track-bolts, binders, handles, latches, catches, et cetera, to be of heavy wrought-iron, built in wall, or bolted through wall or door or shutter. All fire-doors and shutters shall be closed at night, and whenever the building is not in actual use; at least one in three shutters, on each floor above the first, being so arranged that it can be opened from both outside and inside.

Section 6. In all buildings hereafter erected or altered to be used for warehouse, store or factory purposes, the walls shall not be furred with wood; nor shall any partition, extending from floor to ceiling, be constructed with wooden studs. In non-fire-proof buildings, to be used for warehouse, store or factory purposes,. such partitions shall be constructed of some non-combustible material, to be approved by the Bureau of Building Inspection, or of plank not less than three inches thick, with tongues, and dressed on all sides. If such walls or partitions are to be plastered, the plaster shall be applied directly to the masonry or partition, or over metal lath, without air spaces behind it.

In all buildings hereafter erected or altered to be used for warehouse, store or factory purposes, the ceilings shall not be furred with wood, nor shall any wooden or combustible material be applied to form a ceiling. If plaster is applied it shall be applied over metal lath.

Section 7. All buildings of the first, second and third classes, hereafter erected or altered to be used as school houses, tenement houses, apartment houses, flat houses, stores, offices, manufactories, workshops, mills or places of assembly or resort, shall have, in addition to the main stairs or other means of egress, a tower fire escape, or escapes, as set forth in the following schedule:

BUILDINGS OF THE FIRST CLASS

ONE TOWER FIRE-ESCAPE Number of stories in height	Maximum area per floor in square feet.	TWO TOWER FIRE-ESCAPES Area per floor in square feet
3 or 4,	20,000.	Over 20,000 to 25,000.
5,	15,000.	Over 15,000 to 25,000.
6,	12,000.	Over 12,000 to 25,000.
7,	10,000.	Over 10,000 to 22,000.
8,	9,000.	Over 9,000 to 20,000.
9,	8,000.	Over 8,000 to 18,000.
10,	7,500.	Over 7,500 to 17,000.
11,	7,000.	Over 7,000 to 16,000.
12,	6,500.	Over 6,500 to 15,000.

BUILDINGS OF THE SECOND AND THIRD CLASSES

ONE TOWER FIRE-ESCAPE Number of stories in height	Maximum area per floor in square feet	TWO TOWER FIRE-ESCAPES Area per floor in square feet
3,	10,000.	Over 10,000 to 15,000.
4,	6,000.	Over 6,000 to 12,000.
5,	4,500.	Over 4,500 to 10,000.
6,	3,500.	Over 3,500 to 8,000.

If the total floor space above the second floor exceeds the number of square feet as set forth in the above schedule, there may be required, in addition to the above mentioned number of fire-escapes, as many additional tower fire-escapes as the Chief of the Bureau of Building Inspection may determine.

The location and construction of all stairways and tower fire-escapes shall be determined and approved by the Chief of the Bureau of Building Inspection.

Provided, That this section does not apply to office buildings of the first class, nor to buildings less than three stories high, and buildings of a greater number of stories in height than two, in which the stories above the second story are not occupied by persons: Provided, That in store buildings, in which the tower fire-escapes in the first story would interfere with the bulk windows, the said tower may stop at the second floor level, and that an exterior, continuous balcony be provided at the second floor level, with drop ladders.

All buildings used as stores, department stores, or buildings of any kind in which people assemble in the basement of said stores or buildings, there shall be provided safe means of egress from the basement, leading directly to the street, the proper location of such places of egress to be determined by the Chief of the Bureau of Building Inspection.

Section 8. In this act the term "height" of a building, means the vertical distance of the highest point of the roof, in the case of flat roofs; and for high-pitched roofs, the average of the height of the gable above the mean grade of the curbs of all the streets, or the mean grade of the natural ground adjoining the building, if the said grade or ground is not below the grade of the curb.

Section 9. So much of all acts or parts of acts conflicting herewith are hereby repealed.

Approved—The 25th day of April, A. D. 1903.

SAML. W. PENNYPACKER

The foregoing is a true and correct copy of the Act of the General Assembly No. 236.

FRANK M. FULLER
Secretary of the Commonwealth.

No. 282

AN ACT

To amend section twenty-eight of the act, approved the fifth day of May, one thousand eight hundred and ninety-nine (Pamphlet Laws, one hundred and ninety-three), entitled "An act to create a Bureau of Building Inspection, and to regulate the construction, maintenance, and inspection of buildings and party walls in cities of the first class."

Section 1. Be it enacted, &c., That section twenty-eight of the act, approved the fifth day of May, one thousand eight hundred and ninety-nine (Pamphlet Laws, one hundred and ninety-three), entitled "An act to create a Bureau of Building Inspection, and to regulate the construction, maintenance, and inspection of buildings and party walls in cities of the first class," is hereby amended to read as follows:

Section 28. No dwelling house shall be erected on a lot of a less average width than fourteen (14) feet: Provided, That this limitation shall not apply to lots of less than fourteen (14) feet in width having buildings erected thereon: Provided further, That a dwelling house may be erected on a lot of less width than fourteen (14) feet, and a lot of less width than forty-two (42) feet may be subdivided into lots of equal width, upon which dwelling houses may be erected, but no such lot shall be decreased in width to a greater extent than five per centum of fourteen (14) feet. This provision shall only apply when the aforesaid lots are bounded by ground having buildings erected thereon at the time of the approval of this act, or when bounded on each side by ground belonging to other owners at the time of the approval of this act, and every such dwelling shall have an open space attached to it in the rear or at the side equal to at least one hundred and forty-four (144) square feet of clear space, unobstructed by any overhanging structure. In all dwellings hereafter erected the cellars shall extend underneath the whole house and be ventilated from both ends; *or, in lieu of such cellar, it shall have a free air space of not less than eighteen (18) inches between the surface of the ground and the underside of the floor joists, except that where the floor is of waterproofed masonry construction, not less than four (4) inches thick, such free air space may be omitted. In case a free air space is provided in lieu of a cellar, it shall be drained and there shall be openings in the exterior walls for cross ventilation. Such openings shall be screened by heavy galvanized wire mesh screen, or closely fitted iron bars, or other acceptable substitute, so as to prevent the ingress of small animals. When cellars are omitted, dwellings may be set upon piers or foundation walls which shall extend below the frost line and to a depth required by law, and shall have footing to keep load distribution within carrying capacity of the soil.* In low, damp, or made ground the bottom of all cellars shall be covered with concrete or asphalt at least three (3) inches thick, or such material as shall be approved by the Bureau of Building Inspection.

Approved—The 27th day of April, A. D. 1927.

JOHN S. FISHER

The foregoing is a true and correct copy of Act of General Assembly No. 282.

CHARLES JOHNSON
Secretary of the Commonwealth

No. 361

AN ACT

To amend section two of an act, approved the twenty-fifth day of April, one thousand nine hundred and three (Pamphlet Laws, three hundred and four), entitled "An act to further regulate the construction, maintenance, and inspection of buildings and party walls, in cities of the first class."

Section 1. Be it enacted, &c., That section two of an act, approved the twenty-fifth day of April, one thousand nine hundred and three (Pamphlet Laws, three hundred and four), entitled "An act to further regulate the construction, maintenance, and inspection of buildings and party walls, in cities of the first class," which reads as follows:

"Section 2. Any building hereafter erected or altered, to be used as a hospital, asylum or institution for the care or treatment of persons, the height of which exceeds two stories, and every building hereafter erected or altered, to be used as an apartment house, tenement house, flat house, lodging house, hotel, school, or police station, the height of which exceeds four stories, shall be a building of the first class; and no building of any kind, except as hereafter provided, shall be erected or raised to height exceeding sixty-five feet, except the same be a building of the first or second class; and no building shall be erected or raised to a height exceeding eighty-five feet, except the same be a building of the first class; and all buildings of a height exceeding six stories shall be buildings of the first class.

"All buildings of the first class hereafter erected or altered, to be used for warehouse, store, or factory purposes, shall be so divided by fire-proof walls or partitions on every floor, except as hereinafter provided, that no space on any floor, not so divided, shall exceed twenty-five thousand square feet; and no existing wall or partition, in any of such building, shall be removed so as to leave a space, not so divided, of more than twenty-five thousand square feet. Such walls or partitions shall extend from the fire-proof construction of the floors to the fire-proof beam filling of the ceilings. The openings or doorways in any such walls or partitions shall not exceed three in number for each floor, for each such wall or partition, and no such opening shall exceed ten feet in height or ten feet in width. Each opening must be provided with two sets of standard fire-doors, separated by the thickness of the wall or partition, said doors to be constructed and hung as provided elsewhere in this act. All of the said openings through partitions of fire-proof material shall have metal frames or studs securely fastened to floor and ceiling, and such metal studs shall be covered with such fire-resisting materials as shall be approved by the Bureau of Building Inspection. No wood for framing or fastening shall be used for such openings: Provided, however, That the space or spaces, of *the first or grade floor* of any such buildings, may exceed twenty-five thousand square feet, when the entire building is under the protection of an approved system of automatic sprinklers, so long as such system shall be kept and maintained in complete working order. If such system shall not be maintained and kept in such order, it shall be the duty of the Bureau of Building Inspection to give written notice to the tenants or owners, served upon the premises, of said fact, and within sixty days thereafter the division by fire-proof walls or partitions as above provided, shall be made, and thereafter maintained.

"No building shall be deemed a building of the first class unless the enclosing or division walls are wholly or in part supported on iron or steel beams, girders, and columns, such beams, girders, and columns shall be protected against the external changes of the atmosphere and

against fire by a covering of brick, terra-cotta, fire-clay, tile, or other approved fire-proofing, completely enveloping said structural members of iron or steel. Said fire proofing around outside columns and beams, if of brick, shall not be less than eight inches; if of hollow tile, shall not be less than six inches thick, and there shall be at least two sets of air spaces between the iron and steel members and the outside of the hollow tile covering. In all cases the brick or hollow tile shall be bedded in cement mortar close up to the iron or steel members, and all joints shall be made full and solid. No building shall be deemed a fire-proof building unless, in addition to the above required covering of the iron and steel members, all the interior columns, beams, and girders be enveloped in such fire-resisting materials as shall be approved by the Bureau of Building Inspection. The filling between the individual floor beams and girders shall be one of the fire-proof systems in use, as approved by the Bureau of Building Inspection, and must in every case have stood the test of three times the load for which the floor is designed, without sign of cracking. No wood or other inflammable material shall be used in any part of any such building except the doors and windows and their frames, the trims, the casings, the interior finish, when filled at the back with fire-proof materials; and the floor boards and sleepers directly under the spaces between and under the sleepers must be filled up and leveled off at the top of the said sleepers with concrete or other incombustible material. All interior columns, and the lower flanges of all girders of iron or steel, shall be protected with at least three inches of brick, terra-cotta, concrete, or other fire resisting materials, as shall be approved by the Bureau of Building Inspection. The web of all girders and the flanges and web of all beams, to be protected by not less than two inches of terra-cotta, brick, concrete, or other fire-proof material; but the extreme outer edge of lugs, brackets, and similar supporting metal, may project within one inch of the surface of the fire-proofing. Where the bases of iron or steel columns are independent, the said bases shall be either cast-steel, thoroughly annealed, or built-steel bolsters. Built sections of girders or columns, in which all parts are not accessible after erection, shall be filled with concrete, in the proportion of one part of Portland cement to three parts of sand and five parts of stone, to pass a three-fourths of an inch mesh. The maximum span for arches of brick, terra-cotta, concrete, or other patent floors, shall not exceed eight feet; but nothing herein contained shall prohibit the use of reinforced concrete or heterogenous systems, provided the depth of the floor beams or girders is three-fifths of an inch per foot of span, and that a test for strength, and fire and water resistance, satisfactory to the Bureau of Building Inspection, shall be given for said reinforced or heterogenous system. No arch in any floor system shall have a rise of less than one and one-quarter inch per foot of span.

"In buildings of the first class, all pipes, conduits, mains, wiring, and conveyances for conducting heat, light, or water, shall be encased in separate fire-proof ducts, and shall not be enclosed in the fire-proofing surrounding any column, girder, or beam of steel or iron.

"Provided, also, That this section shall not apply to one-story buildings, used only for working in non-combustible materials, and that nothing contained in this section shall prevent the erection of grain elevators, church spires, towers for observation purposes, and structures for similar uses, all of which structures shall be constructed in such manner and under such conditions as may be prescribed by the Bureau of Building Inspection," is hereby amended to read as follows:—

Section 2. Any building hereafter erected or altered to be used as a hospital, aslyum, or institution for the care or treatment of persons, the height of which exceeds two stories, and every building hereafter erected

or altered to be used as an apartment house, tenement house, flat house, lodging house, hotel, school, or police station, the height of which exceeds four stories, shall be a building of the first class; and no building of any kind, except as hereafter provided, shall be erected or raised to a height exceeding sixty-five feet, except the same be a building of the first or second class; and no building shall be erected or raised to a height exceeding eighty-five feet, except the same be a building of the first class; and all buildings of a height exceeding six stories shall be buildings of the first class.

All buildings of the first class hereafter erected or altered to be used for warehouse, store, or factory purposes, shall be so divided, by fire-proof walls or partitions on every floor, except as hereinafter provided, that no space on any floor, not so divided, shall exceed twenty-five thousand square feet, and no existing wall or partition in any of such building shall be removed so as to leave a space, not so divided, of more than twenty-five thousand square feet. Such walls or partitions shall extend from the fireproof construction of the floors to the fireproof beam filling of the ceilings. The openings or doorways in any such walls or partitions shall not exceed three in number for each floor for each such wall or partition, and no such openings shall exceed ten feet in height or ten feet in width. Each opening must be provided with two sets of standard fire doors, separated by the thickness of the wall or partitions; said doors to be constructed and hung as provided elsewhere in this act. All of the said openings through partitions of fire-proof material shall have metal frames or studs securely fastened to floor and ceiling, and such metal studs shall be covered with such fire-resisting materials as shall be approved by the Bureau of Building Inspection. No wood for framing or fastening shall be used for such openings: Provided, however, That the space or spaces of *any and all floors* of such buildings may exceed twenty-five thousand square feet, *but not exceed seventy-five thousand square feet,* when the entire building is under the protection of an approved system of automatic sprinklers, so long as such system shall be kept and maintained in complete working order. If such system shall not be maintained and kept in such order it shall be the duty of the Bureau of Building Inspection to give written notice to the tenants and owners, served upon the premises, of said fact, and, within sixty days thereafter, the division by fire-proof walls or partitions, as above provided, shall be made, and thereafter maintained.

No building shall be deemed a building of the first class unless the enclosing or division walls are, wholly or in part, supported on iron or steel beams, girders and columns. Such beams, girders, and columns shall be protected against the external changes of the atmosphere and against fire by a covering of brick, terra-cotta, fire-clay, tile, or other approved fire-proofing, completely enveloping said structural members of iron or steel. Said fire-proofing around outside columns and beams, if of brick, shall not be less than eight inches; if of hollow tile, shall not be less than six inches thick, and there shall be at least two sets of air spaces between the iron and steel members and the outside of the hollow tile covering. In all cases, the brick or hollow tile shall be bedded in cement mortar close up to the iron or steel members, and all joints shall be made full and solid. No building shall be deemed a fire-proof building unless, in addition to the above required covering of the iron and steel members, all the interior columns, beams, and girders be enveloped in such fire-resisting materials as shall be approved by the Bureau of Building Inspection. The filling between the individual floor beams and girders shall be one of the fire-proof systems in use, as approved by the Bureau of Building Inspection, and must in every case have stood the test of three times the load for which the floor is designed, without sign of cracking. No wood or other inflammable

material shall be used in any part of any such building, except the doors and windows and their frames, the trims, the casings, the interior finish, when filled at the back with fire-proof materials; and the floor boards and sleepers directly under the spaces between and under the sleepers must be filled up and leveled off at the top of the said sleepers with concrete or other incombustible material. All interior columns and the lower flanges of all girders of iron or steel shall be protected with at least three inches of brick, terra-cotta, concrete, or other fire-resisting materials, as shall be approved by the Bureau of Building Inspection. The web of all girders and the flanges and web of all beams, to be protected by not less than two inches of terra-cotta, brick, concrete, or other fire-proof material; but the extreme outer edge of lugs, brackets, and similar supporting metal may project within one inch of the surface of the fire-proofing. Where the bases of iron or steel columns are independent, the said bases shall be either cast-steel, thoroughly annealed, or built-steel bolsters. Built sections of girders or columns, in which all parts are not accessible after erection, shall be filled with concrete in the proportion of one part of Portland cement to three parts of sand and five parts of stone, to pass a three-fourths of an inch mesh. The maximum span for arches of brick, terra-cotta, concrete, or other patent floors shall not exceed eight feet; but nothing herein contained shall prohibit the use of reinforced concrete or heterogeneous systems, provided the depth of the floor beams or girders is three-fifths of an inch per foot of span, and that a test for strength and fire and water resistance, satisfactory to the Bureau of Building Inspection, shall be given for said reinforced or heterogenous system. No arch in any floor system shall have a rise of less than one and one-quarter inch per foot of span.

In buildings of the first class, all pipes, conduits, mains, wiring, and conveyances for conducting heat, light, or water, shall be encased in separate fire-proof ducts, and shall not be enclosed in the fire-proofing surrounding any column, girder, or beam of steel or iron:

Provided also, That this section shall not apply to one-story buildings used only for working in non-combustible materials, and that nothing contained in this section shall prevent the erection of grain elevators, church spires, towers for observation purposes, and structures for similar uses; all of which structures shall be constructed in such manner and under such conditions as may be prescribed by the Bureau of Building Inspection.

Approved—The 20th day of May, A. D. 1921.

WM. C. SPROUL

The foregoing is a true and correct copy of the Act of the General Assembly No. 361.

CYRUS E. WOOD
Secretary of the Commonwealth

TENEMENT HOUSES

No. 110

A SUPPLEMENT

To an Act entitled, An Act Amending Section One of Article Three of An Act, entitled: An Act for the Better Government of Cities of the First Class in this Commonwealth, approved the first day of June, A. D., one thousand eight hundred and eighty-five, regulating the construction, maintenance and inspection of buildings, Approved the eighth day of June, A. D., one thousand eight hundred and ninety-three, regulating the construction, alteration and ventilation of tenement houses, and

providing for the safety of the inhabitants thereof, and providing penalties for the violation of same.

Section 1. Be it enacted, etc. That no tenement house shall hereafter be erected, altered or constructed in any city of the first class, unless such erection, alteration or construction, shall be in conformity with the provisions of this Act.

Section 2. Every tenement house hereafter erected, altered or constructed in any city of the first class, shall have attached to it in the rear or at the side, an open space equal in area to at least twenty per centum, the entire area of the lot upon which said tenement house is erected, which open space shall be unobstructed by any overhanging structure except fire escapes, required by law, unless however, such tenement house shall be erected upon a corner of two streets, neither of which is less than twenty feet in width, in which case said tenement house shall have an open space attached to it in the rear, or at the side next the adjoining lot equal in area to at least ten per centum of the entire area of the lot upon which said tenement house is erected, which open space shall be unobstructed by any overhanging structure, except fire escape, required by law; and every such tenement house which shall be erected upon a lot bounded on three sides by streets, not less than twenty feet in width may be erected to cover the entire area of said lot, provided that every window opening from the living room in said tenement house shall open upon one of such streets. Such open space attached to every such tenement house shall be at least eight feet in width throughout its entire length. No court or open space between tenement houses or between wings of a tenement house shall be of a less width than twelve feet. If such tenement house shall be built upon a lot which is bounded on two opposite sides by streets, then at least one end of such open space shall abut upon one of such streets. Every court or shaft which shall be built for the purpose of furnishing light or air to any such tenement house shall open upon one side into a street, or into the yard or open space, except such shafts as may be necessary for the ventilation of water closets or bath rooms.

Section 3. Every room in every such tenement house shall have at least one window opening upon a street, or upon the open space provided for in the second section of this act. And the distance from every window in every such tenement house to the wall or party line opposite to it, shall be at least eight feet. The halls in each floor of every such tenement house shall have a window or windows opening either upon a street or upon the open space provided for in the second section of this act, and shall have no room or other obstruction at the end, unless sufficient light and ventilation is otherwise provided for said hall in a manner approved by the Chief of the Bureau of Building Inspection. But whenever in the judgment of the Chief of the Bureau of Building Inspection it shall be possible to construct such tenement house without corridors connecting the entrance of several tenements or suites of rooms, the Chief of the Bureau of Building Inspection may require that such tenement house be so constructed that it shall contain no such corridors.

Section 4. Every habitable room in every such tenement house shall be of such dimensions as to contain at least seven hundred cubic feet of air. Every habitable room in every such tenement house shall be in every part not less than eight feet in height from floor to ceiling and every window shall have an opening of not less than twelve square feet in the superficial area; but the Bureau of Building Inspection may permit windows of less than twelve square feet, if more than one window is provided for a room; so that however, the total window space for every one room shall not be less than twelve square feet.

Section 5. All stairways in such tenement houses shall lead directly to the ground floor. The location and construction of all stairways

shall be determined by the Chief of the Bureau of Building Inspection so as to provide for the safety of the occupants of such tenement house.

All such tenement houses shall be provided with a tower fire escape or tower fire escapes enclosed in incombustible material the number and location of which shall be determined by the Chief of the Bureau of Building Inspection.

All stairways shall have a rise of over eight inches to a step; and not be less than nine inches tread, exclusive of the nosing. All stairways and all hallways must be not less than three feet in width in houses containing less than fifteen rooms; not less than three feet six inches in width in houses containing not less than fifteen rooms and not more than twenty-five rooms; and not less than four feet in width in houses containing twenty-five or more rooms.

Section 6. In every such tenement house there shall be one water closet for every tenement or suite of rooms which has its own independent hallway, so separated that its rooms do not open into or connect with any other rooms; and in tenement houses so constructed that a tenement may consist of a single room, or of two rooms, there shall be at least one water closet for every three rooms: Provided, That in the case of buildings existing at the date of this act which shall hereafter be altered into tenement houses, there shall be one water closet for six rooms, but not less than one for each floor. Every water closet shall be separated from every other water closet and shall have an entrance entirely independent of the entrance to every other water closet. There shall also be an independent water supply and at least one sink for every tenement or suite of rooms. No hydrant shall be permitted in the yard or open space provided for in the second section of this act.

Section 7. In every such tenement house there shall be a suitable receptacle for ashes, constructed of incombustible material, and interior chutes or shafts, leading to the same shall not be permitted.

Section 8. All such tenement houses, more than four stories in height, which shall hereafter be erected, altered or constructed, shall be made fire-proof throughout: Provided, however, That this section shall not preclude the use of wooden floor boards and sleepers or beams to which to fasten the same, which however, shall be imbedded to their top surface in the combustible material.

Section 9. The Chief of the Bureau of Building Inspection shall require such plans and specifications of any proposed erections, alterations, or constructions of tenement houses as superficially set forth and record the intent of the builder to comply with the requirements of this act, to be filed with him. And no permit for the erection or construction of any such tenement house shall be granted, unless the same shall be in conformity with the provisions of this act.

Section 10. Any person who shall erect, alter or construct such a tenement house, except in conformity with the provisions of this act shall be guilty of a misdemeanor and on conviction thereof shall be sentenced to an imprisonment of three months, or to pay a fine not exceeding five hundred dollars, or both, at the discretion of the court.

Section 11. Whenever any owner or builder shall deem himself aggrieved by any decision of the Chief of the Bureau of Building Inspection made in performance of the powers conferred upon him by this act, such owner or builder shall be entitled to an appeal from such decision, as provided by Section 5 of the act to which this is a supplement.

Section 12. The term tenement house in this act shall be taken to mean any building which, or a portion of which, is occupied, or is to be occupied, as a residence of three or more families, living independently of each other and doing their cooking upon the premises.

Approved this Seventh day of June, A. D., 1895.

DANIEL H. HASTINGS

PROTECTING PUBLIC HEALTH

AN ACT

To protect the public health and safety: By regulating the erection, alteration, repair, use, occupancy, maintenance, sanitation, and condemnation of dwellings, two-family dwellings, rooming houses, and tenements; by regulating the use, maintenance, and sanitation of the grounds surrounding the same, the adjoining buildings, and all vacant land, in cities of the first class; providing for their inspection, the abatement of nuisances, the vacating of uninhabitable houses, and the filing of liens; creating a Division of Housing and Sanitation and providing penalties for violations of the provisions thereof, and repealing all laws inconsistent therewith.

Section 1. Be it enacted, &c., That there shall be in cities of the first class a Division of Housing and Sanitation, attached to the Department of Public Health and Charities; which division and all its officers and employes shall be under the supervision and control of the Director of the Department of Public Health and Charities, and shall, under said department, having jurisdiction over all matters coming within the provisions of this act, and all laws, ordinances of such cities, and rules and regulations of the Bureau or Board of Health, in any way affecting or regulating the use, occupancy, sanitation, or maintenance of all buildings, grounds, and vacant lands herein mentioned.

ORGANIZATION

Section 2. There shall be a chief of the said division, to be known as the Chief of the Division of Housing and Sanitation, who shall have had experience in sanitary work. An assistant chief and one or more supervising inspectors, all of whom shall be qualified by training or experience; a statistician, sufficient inspectors, and such stenographers, typewriters, messengers, and other employes as the Director of the Department of Public Health and Charities shall deem necessary, subject to the approval of select council. The city councils, with the approval of the mayor, shall fix their respective salaries. None of the foregoing officers shall be otherwise employed.

The Director of the Department of Public Health and Charities shall, immediately after the city councils by ordinance create the said division, organize and establish said division by transfer thereto of the inspectors and employes of the Division of Sanitation and Tenement House Inspection. Where there is no substantial change made in the duties or salary of the person transferred, he shall be placed in the new position without a civil service examination. Such other employes as this act provides for shall be appointed by the Director of the Department. The chief of the division shall forthwith organize a subdivision thereof, which shall have charge and control of all matters relating to the construction and reconstruction of the plumbing and house connections of all buildings. Said subdivision shall be in immediate charge of one of the supervising inspectors. Said supervising inspectors, and each of the persons who may perform the duties of the examinations of plans of proposed plumbing work, or the inspection of plumbing and house connections, or who may perform any of the technical work necessary in the operation of this division, shall be required to have had at least five years' experience as a practical plumber.

DUTIES OF OFFICERS

Section 3. The chief of the division shall have the management and direction of all matters coming with the jurisdiction of and pertaining to the Division of Housing and Sanitation. He shall provide for the inspection of all properties under the provisions of this act. He shall keep suitable records of inspections, together with all permits and orders, which shall be open to public inspection during business hours.

The Director of the Department of Public Health and Charities may revise or revoke any action of the chief of said division.

The assistant chief shall assist in the management and control of all matters pertaining to the division, and, in the absence or disability of the chief, exercise all the powers of said chief.

The other inspectors shall, under the direction of their superior officers, inspect all properties under this act, as often as necessary, and make adequate records and reports thereof, and perform such other duties as shall properly come within the scope of said division.

GENERAL PROVISIONS

Section 4. Whenever in this act the "present tense" is used, it shall include the future tense.

The "masculine gender" shall include the feminine and neuter genders.

The "singular number" shall include the plural.

The word "shall" shall be mandatory and not directory.

The word "person" shall include any association, partnership or corporation as well as a natural person.

The word "converted" shall mean either a change in the character of occupancy or in construction.

The words "ordinances," "regulations," "Bureau of Building Inspection," "department," or "board," or "Bureau of Health" shall be construed as if followed by the words "in cities of the first class."

The words "is occupied," applying to any building, shall be construed as if followed by the words "or is intended, arranged, or designed to be occupied."

The words "satisfactory or approved" shall be construed as if followed by the words "to" or "by" "the Chief of the Division of Housing and Sanitation."

The term "tenement" shall mean any house or building which, or a portion of which, is occupied as a residence by three or more families, living independently of each other, and doing their cooking on the premises, and having a common right in the halls, stairways, yard, cellar, or water-closets thereof, or some of them.

The term "dwelling" shall mean any house or building, not a lodging house within the terms of the act of Assembly of July second, one thousand eight hundred and ninety-five (Pamphlet Laws, four hundred and twenty-eight), entitled "An act to regulate and license public lodging houses in the different cities in this Commonwealth," and not a tenement rooming house or inn, all or any part of which is occupied as the home or residence of a family, or of two or more families living independently of each other, and having no common right or use of any hall, stairway, cellar, water-closet, or privy; and whether such house is built singly, or as part of a double house, or in conjunction with others in an attached or semi-detached row, it shall be deemed a dwelling.

A "two-family dwelling" is any house not a tenement, dwelling, rooming house or inn, and which is occupied by two families, who use a common entrance or hallway.

The term "rooming house" shall mean and include any house or building, or portion thereof, not a lodging house within the terms of the act of Assembly of July second, one thousand eight hundred and ninety-five (Pamphlet Laws, four hundred and twenty-eight), entitled "An act to regulate and license public lodging houses in the different cities in this Commonwealth," and not a tenement or inn, and in which persons, either as single individuals or as families, are harbored or received, housed or lodged, for hire or otherwise, for a single day or night or for a longer period; provided that this shall not include a dwelling where less than five persons are so received and lodged.

The term "apartment" shall mean a room, or suites of two or more rooms, which is or are occupied as a home for one or more persons.

For the purpose of this act, all buildings herein referred to shall be graded according to their use or occupancy. Buildings of the highest or first grade shall include all dwellings, as hereinbefore defined. Buildings of the second grade shall include all two-family dwellings, as hereinbefore defined. Buildings of the third and lowest grade shall include all rooming houses and tenements, as hereinbefore defined.

A living room, or room used for living purposes, is any room, not a water closet, bathroom, or other room used solely for storage or closet purposes, and which is used, in whole or in part, for any household purpose.

A yard is an open, unoccupied space on the same lot with a tenement, rooming house, or dwelling, and which space extends in its full width or depth between opposite lot lines.

A court is an open, unoccupied space, other than a yard, on the same lot with a tenement, rooming house, or dwelling.

A sewer is a public sewer, or a private sewer tributary thereto, and accepted by the bureau of surveys.

A school sink is any vault or box used, or designated to be used, to receive urine and fecal matter which is washed to the sewer by means of a steady or intermittent flow of water.

An entrance hall is a public hall on the first story, admission to which is made from the street or yard, court or alley.

A public hall is a hall, corridor, or passageway not within an apartment.

A stair hall includes the stairs, stair landings, and the portion of any hall through which it is necessary to pass in going between the entrance floor and roof.

A basement is a room or rooms partly, but not more than one-half, below the level of the ground surrounding the building.

A cellar is a room, or rooms, more than one-half below the level of the ground surrounding the building.

APPROVING PLANS

Section 5. All plans for the erection, construction, or alteration of buildings of the grade referred to in this act, for the alteration of houses already erected, or other buildings intended for occupancy for any other grade, besides being submitted to the bureaus now charged with the approval of the same, shall be submitted to the Chief of the Division of Housing and Sanitation, for his approval of the sanitary requirements of said plans and of the sanitary conditions surrounding the ground over which the proposed building is to be erected; and until such approval is obtained and indorsed on such plans the work for construction or alteration shall not begin. All plans for the installation or alteration of plumbing, ventilation, fixtures, cesspools, sinks, or privy-wells shall be submitted to the supervising inspector in charge of plumbing and house drainage, for his approval.

Both Bell and Keystone telephone numbers make the Classified Building Trade Directory of still greater service.

LIGHT AND VENTILATION

PER CENTUM OF LOT TO BE OCCUPIED

Section 6. No building shall be occupied as a tenement unless it shall have appurtenant to it in the rear or at the side, and as a part of the lot upon which it is located, an open space equal to at least twenty per centum of the entire area of such lot, which open space shall be unobstructed by any overhanging structure except fire escapes required by law; unless, however, such tenement shall be located upon a corner of two streets, neither of which is less than twenty feet in width, in which case said tenement shall have an open space attached to it, in the rear or at the side next the adjoining lot, equal in area to at least ten per centum of the entire area of the lot upon which said tenement is located, which open space shall be unobstructed by any overhanging structure except fire escapes required by law; and any such tenement located upon a lot bounded on three sides by streets, none of which is less than twenty feet in width, may cover the entire area of said lot: Provided, That at least one window, not less than the minimum size hereinafter provided, opening from each of the rooms in such tenement, shall open upon one of the streets. Such open space attached to every tenement shall be at least eight feet in width throughout its entire length. No court or open space between tenements, or between wings of a tenement, shall be of a less width than twelve feet, except in buildings erected prior to June seventh, one thousand eight hundred and ninety-five, and which are not over three stories in height; where the open space is between the walls of the walls of the wings of tenements there shall be an approved open space five feet in width, provided the length of such wing or wings is not more than thirty feet, and, for each additional ten feet in length, there shall be an additional foot in width, provided there is at the rear or at the side of the lot upon which the building is erected an open space equal to at least twenty per centum of the entire lot area, which open space shall be unobstructed by any overhanging structure except fire escapes required by law. If such tenement is situated on a lot which is bounded on two opposite sides by streets, then at least one end of every such open space shall abut upon one of said streets. Every court or shaft furnishing light or air to any such tenement shall open, upon one side, into a street, or into a yard or open space, except such shafts as are used solely for ventilation of water closets or bathrooms, which, for the purpose of cleaning same, shall have a door or window giving sufficient access for such purposes on the ground floor leading thereto. Buildings erected as tenements, or physically altered into tenements, prior to June seventh, one thousand eight hundred and ninety-five, shall be exempt from the provisions of this section governing the percentage of the lot occupied, the width between the wings, and the width of the court; and such other buildings shall likewise be exempt as have been listed on the records of the Department of Public Health and Charities, and consecutively occupied as tenements prior to the passage of this act.

ALTERATIONS OF BUILDING AND OPEN AREAS

Section 7. No yard, court, or open area, appurtenant to any building of the grades referred to in this act, shall be reduced, through the erection or alteration of any kind of building on the same lot, to a size less than the minimum yard, court, or open area required when new buildings of like grade are constructed.

CHANGE IN GRADE OF OCCUPANCY

Section 8. No building of a higher grade of occupancy shall be converted to the use of a building of a lower grade of occupancy, except as provided in section six of this act, unless it shall be made to conform in all particulars, as to safety in structure and requirements in sanitation and health, to the class to which the lower grade belongs. No building not now in one of the grades referred to in this act shall be converted into any such grade without conforming to all the requirements of this and other acts, and all the rules and regulations relating to such grades.

TWO-FAMILY DWELLINGS

Section 9. All two-family dwellings, unless otherwise specifically stated in this act, shall be subject to the same requirements as dwellings.

INCREASE IN HEIGHT OF BUILDINGS

Section 10. No building of any grade referred to in this act shall be increased in height, if it is situated on a rear lot, alley, court, street, or other passageway twenty feet or less in width.

LIGHT

Section 11. Whenever the windows of a building used for human habitation receive their light from a yard, alley, court, or passageway, the line of which is formed by a fence six feet in height, wall or building five or less feet distant, such fence, wall or building, facing such yard, alley, court, or passageway, shall be white-washed or painted white, and shall be maintained in such condition so as to reflect the maximum available light to such windows.

WINDOWS

Section 12. No room in any tenement erected or converted since June seventh, one thousand eight hundred and ninety-five, shall be occupied for living purposes, unless it has a window lighting area of at least twelve square feet, the upper half of which surface shall open fully. At least one window of the required size shall open directly upon a street, yard, or open area not less than that provided for in section six of this act. No room in any other building of the grades referred to in this act shall be occupied for living purposes, unless it has a window or windows of an approved lighting area opening to the outer air. The upper half of all such windows shall open fully.

ALCOVE AND ALCOVE ROOMS

Section 13. No part of any room, in any building of the grades referred to in this act, shall be enclosed or subdivided, in whole or in part, by a fixed or movable partition, or other contrivance or device,

unless such part of the room, so enclosed or subdivided shall contain a separate window as herein required for ordinary rooms, and shall have a floor area of not less than seventy square feet.

WINDOWS IN HALLS

Section 14. No tenement erected prior to June seventh, one thousand eight hundred and ninety-five, no dwelling converted into a tenement, no two-family dwelling or rooming house, shall be used for human habitation, unless all public halls are lighted on each floor by a window, or windows, of an approved lighting area, opening directly to the outer air, the upper half of which surface opens fully: Provided, however, That whenever any such public hall cannot reasonably be so lighted and ventilated, translucent glass panels of at least four square feet shall be inserted in the wall or in the doors, or as transoms above the doors, leading to the rooms whose windows open directly to the outer air. Such halls shall have a ventilating skylight of satisfactory area in the top floor, directly over the stairway, and, where such is or may be built in, it shall be an acceptable substitute for windows either leading to the outer air or to rooms that lead to the outer air, on the top floor. No tenement erected since June seventh, one thousand eight hundred and ninety-five, shall be occupied for human habitation, unless the windows in its public halls conform to the requirements of section three of the act of Assembly of June seventh, one thousand eight hundred and ninety-five (Pamphlet Laws, one hundred and seventy-eight) entitled "A supplement to an act, entitled 'An act amending section one of article three of an act, entitled "An act for the better government of cities of the first class in this Commonwealth," approved the first day of June, Anno Domini one thousand eight hundred and eighty-five, regulating the construction, maintenance, and inspection of buildings,' approved the eighth day of June, Anno Domini one thousand eight hundred and ninety-three, regulating the construction, alteration, and ventilation of tenement houses, and providing for the safety of the inhabitants thereof, and providing penalties for the violation of the same." If, after the foregoing provisions have been complied with such public halls are not adequately lighted in the daytime, the owner, lessee, or conductor of such house shall keep a proper light burning in the hallways, near the stairs, as may be necessary, from sunrise to sunset.

LIGHT IN PUBLIC HALLS AT NIGHT

Section 15. In every public hall, near the stairs in a tenement or rooming house, an adequate light shall be kept lighted by the conductor, from sunset to at least ten post meridian; and in the entrance hall, and the hall of the second floor above, an adequate light shall be kept lighted all night. Such light shall be adequately protected by a glass shade or wire screen.

LIGHT IN CORRIDORS, CELLARS, ET CETERA

Section 16. Whenever it is necessary to improve the lighting of any hall, corridor, cellar, basement, or other part of a two-family dwelling, rooming house, or tenement, used in common by two or more families, in addition to the provisions for this purpose otherwise stated in this act, the Chief of the Division of Housing and Sanitation may order the walls and ceiling, or both, to be painted or white-washed, kalsomined, or papered in white or other approved light color.

CELLAR VENTILATION

Section 17. The cellar or space underneath the first floor of every building used for human habitation, shall, when feasible, be so ventilated as to secure a constant supply of fresh air, and when feasible shall be lighted by windows.

CELLAR AND BASEMENT ROOMS

Section 18. No cellar or cellar room shall be used for living purposes. No basement room in any building of the grades referred to in this act shall be used for living purposes, other than laundry, the finished ceiling of which is less than seven feet above the finished floor level, and the walls of which are not dampproof and waterproof. Such rooms shall have a window area equal to that required in section twelve, and shall not be used for sleeping purposes, unless along the side containing the window there is an open area, of not less than six inches, below the level of the window sill, and extending upward to the surface of the street, which area shall be satisfactorily drained. The tenant of a cellar room or basement not conforming to the above requirements shall be subject to the penalties hereinafter provided for violations of this act, and the chief of the division shall thereupon notify the agent or owner, and the lessor if he be not the owner, that such tenancy shall be terminated.

SANITATION

COURTS AND AREAS TO BE DRAINED

Section 19. All courts, yards, areas, and alleys about buildings of the grades referred to in this act shall be properly graded, so as to receive thorough drainage in all their parts. If necessary the chief of the division shall order such spaces filled or repaved, so as to eliminate all stagnant ponds or waters and thus destroy the breeding places of mosquitos.

RAIN LEADERS

Section 20. The rain conductors of all buildings of the grades referred to in this act shall be connected wiith a sewer, if there is one in the street contiguous thereto, or, if there is none, as soon as such sewer is laid, but at no time shall the flow therefrom be permitted to go over the sidewalk or upon the adjoining property.

RAIN CONDUCTORS NOT TO BE USED AS WASTE PIPES

Section 21. No fixtures, sink, closet, or drain of any kind, receiving house sewage, shall empty into a rain conductor, nor discharge on a roof draining to a rain conductor.

HOUSE TO BE SEWER CONNECTED

Section 22. Every dwelling or rooming house accessible to a sewer shall be connected therewith. All privy vaults or cesspools and school sinks shall be removed from the premises of any dwelling or rooming house after a sewer has been laid in a contiguous street. No building shall be used as a tenement unless it is sewer connected, and all cesspools, privy vaults, and school sinks shall have been removed from the premises thereof.

WATER CLOSETS

Section 23. Every dwelling to which a public sewer and water main is accessible shall have a water closet, thoroughly flushed at all times, in a separate and independent compartment; and in dwellings having a furnace or other heating system there shall be, when feasible, at least one such water closet located within such dwelling in a separate compartment or in a bathroom.

NUMBER AND LOCATION OF WATER CLOSETS

Section 24. In every rooming house there shall be at least one water closet, in a separate compartment, for every four rooms or major fractional part thereof, approached by an entrance independent of any living room. In each two-family house or tenement there shall be at least one water closet, contained in a separate compartment, for each family occupying the premises; except that, where there are apartments of one or two rooms, there shall be at least one water closet for each three families, located in a separate compartment on the same floor with the apartments it is to serve, if feasible; otherwise, it shall be in a place easily accessible to such apartments. Such water closet shall be approached by at least one entrance independent of a living room. At least one water closet, for each other apartment in such buildings, shall have at least one entrance by separate hall or passageway, independent of a room used for sleeping purposes; except that, where such apartment consists of a kitchen, a bathroom and not more than two living rooms, and is occupied by not more than one family, said entrance may be direct from a living room. No water closet shall be maintained in the cellar or basement of any building, without a permit from the Bureau or Board of Health; but under no circumstances shall the general water closet accommodations of a rooming house or tenement be permitted in a cellar or basement.

PRIVIES

Section 25. Where a sewer is not accessible to a dwelling there shall be a privy vault located in the yard thereof, and constructed in accordance with the laws, ordinances, and rules of the Bureau or Board of Health relating thereto. Such privy vault shall be cleaned to the bottom whenever the contents come within three feet of the level of the ground outside; or within three feet of the floor of the privy house, if such floor is below the level of the surrounding ground, and shall be corrected with lime by the tenant or occupant of the property whenever it becomes foul.

WATER SUPPLY

Section 26. Where water mains have been placed in a street, and there is sufficient pressure, water shall be introduced in every dwelling, and in every apartment of two or more rooms in a two-family house, and in a tenement: Provided, That, in sparsely populated districts where there is a well upon the premises, and the water therefrom is of standard purity required by the Board of Health, such well may be considered an acceptable substitute for water in dwellings. When one or more apartments consist of but one room, there shall be at least one source of water supply, in an easily accessible place, for every two such apartments. In all rooming houses water shall be introduced in an accessible place on each floor: Provided, That where less than three rooms are on each floor of a rooming house, water may be introduced on every alternate floor. Wherever a water fixture is introduced, a sink, and suitable drain, properly trapped, leading from it, shall also be installed. No such sink in a tenement shall be enclosed with any woodwork.

PLUMBING

Section 27. All plumbing, water closets, and the compartments in which they are located, pipes and other like fixtures in dwellings, rooming houses, and tenements, shall be installed and maintained, in accordance with the plumbing regulations of cities of the first class.

CELLARS TO BE DAMPPROOF AND WATERPROOF

Section 28. All cellars or spaces beneath the first floor or basement of any building of the grades referred to in this act shall be dampproof and waterproof, and when, in the opinion of the Chief of the Division of Housing and Sanitation, conditions require it, they shall be concreted with good concrete and a finished surface to a depth of not less than four inches, and the walls shall be coated with the same or other non-permeable surfacing to such depth as to prevent the incoming of water.

OCCUPANCY—OVERCROWDING

Section 29. No room in any dwelling house, rooming house, or tenement house, which is used for sleeping purposes, shall be occupied or permitted to be occupied at any time by more occupants than would permit for each occupant over twelve years of age at least four hundred cubic feet of air space, and for each occupant under twelve years of age at least two hundred cubic feet of air space.

ANIMALS AND FOWLS IN BUILDING

Section 30. No horse, cow, calf, swine, sheep, or goat shall be kept or slaughtered in a dwelling, rooming house, or tenement, or any part thereof; nor shall any other animal or fowl, deemed objectionable by the Chief of the Division of Housing and Sanitation, be kept or slaughtered in any such building; nor shall any of the aforesaid animals or such fowl be kept in the yard of any such building, or the lot thereof, or the property adjoining, in closely built-up sections, without the person desiring to keep the same first having obtained a permit from the Bureau or Board of Health. Application for such permit shall be accompanied by a fee of fifty cents; and such permit, when granted, shall expire not later than the calendar year for which it is issued.

UNINHABITABLE HOUSES TO BE VACATED

Section 31. Whenever any dwelling house, tenement house, two-family dwelling house, or rooming house, or any part thereof, for any reason whatsoever, is unfit for human habitation or is dangerous to life and health, or is being maintained and occupied contrary to the laws and ordinances governing such buildings in cities of the first class or the provisions of this act, or is dangerous to life and health, the Chief of the Division of Housing and Sanitation shall issue an order to all persons therein requiring them to vacate such building, or part thereof, within not less than one or more than thirty days after service of such notice; the reason therefor to be mentioned in such order, a copy of which shall be served at the same time upon the last registered owner of such property, by leaving the same at the last known residence or address of such owner, or, if such address is not known, by posting the same in a conspicuous place upon such building. And it shall thereafter be unlawful for any person or persons to occupy, or permit the occupancy of, such house, or any designated part thereof, until the Chief

of the Division of Housing and Sanitation is satisfied that the provisions of the laws of the Commonwealth, the ordinances of the city, and the rules and regulations of the Bureau or Board of Health have been complied with, and that the dangers from said house have ceased to exist. And whenever, in the opinion of the Chief of the Division of Housing and Sanitation, any building of any kind is in such physical condition as to be a menace to life or to adjoining properties, he shall forthwith report the same to the Department of Public Safety.

MANUFACTURING IN HOUSES

Section 32. No room or rooms in any dwelling house, rooming house, or tenement which are used for manufacturing purposes shall be occupied, at any one time, by more persons than would give to each occupant at least four hundred cubic feet of air space; and no such room or rooms shall be so occupied, in any instance, except by a permit from the Bureau or Board of Health, which permit shall expire not later than the calendar year for which it is issued. No such permit shall be granted if such use would create dust, foul odors, or undue noise, liable to affect injuriously the health or comfort of those engaged therein, or of the tenants, occupants, or neighbors.

JANITOR

Section 33. In a tenement occupied by six or more families, in which the owner or conductor does not reside, there shall be a janitor, housekeeper, or other responsible person, who shall reside therein and have charge thereof, if required by the chief of the division.

WOODEN TENEMENTS

Section 34. No wooden building exceeding three stories in height shall be occupied as a tenement; and no wooden building of any height shall be occupied as a tenement, if located within the limits established by councils in cities of the first class prohibiting the erection of frame buildings.

FIRE ESCAPES

Section 35. No building of any of the grades referred to in this act shall be used for human habitation unless it is equipped with a fire escape or fire escapes as required by law: Provided, That any building of such grades having less than four (4) stories, and used as a rooming house or tenement, the third story of which shall contain not more than five (5) rooms and a bathroom, and such third story is not occupied by more than ten (10) persons, and has at least one stairway therefrom, shall be exempt from the provisions of the acts of Assembly requiring fire towers and outside fire escapes for such buildings, if every apartment above the second floor in any of said buildings shall be equipped with a satisfactory wire, chain, or other safe fire escape.

NO INCUMBRANCE ON FIRE ESCAPE

Section 36. The owner of every occupied dwelling upon which there is a fire escape shall keep such fire escape in good order and repair, and wherever rusty shall have it properly painted with two coats of paint. No person shall at any time place any incumbrance of any kind before or upon any fire escape, scuttle, or bulkhead. The tenant

or occupant of each apartment shall be liable for any incumbrances on the fire escape, scuttle, or bulkhead adjoining his apartment.

STORAGE OF CERTAIN GOODS FORBIDDEN

Section 37. No dwelling, rooming house, or tenement, or any part thereof, occupied as such, shall be used as a place of storage, keeping, or handling of feed, hay, straw, excelsior, cotton, paper stock, feathers, or rags, or for any matter or thing dangerous or detrimental to health or life, except as hereinafter provided; nor shall any such building or any adjacent or contiguous property receive, store, or keep dung, or manure of any kind, except a stable, where such cleanings from the stalls may be stored for a period of not longer than seven days, in a water tight sanitary bin, built wholly inside the building line of the property upon which it is situated: Provided, That in sparsely populated districts such stable cleanings may be kept for a longer period, if kept according to the rules and regulations of the Board or Bureau of Health.

COMBUSTIBLE MATERIALS—PAINTS, OILS, ET CETERA

Section 38. No basement or cellar or room, or rooms, in any dwelling or rooming house shall be used as a paint or oil shop, or for any kind of a store where highly combustible materials or goods are kept, unless the same conform to the rules and regulations of the Board or Bureau of Health approved by select council.

BAKERIES AND FAT BOILING

Section 39. No tenement house, or any part thereof, shall be used as a bakery or as any place of business in which fat is boiled, unless the ceiling, side walls, and all exposed woodwork therein, or in the part thereof so used, is lined with fire-proof materials satisfactory to the chief of the division and the Director of the Department of Public Safety.

MAINTENANCE—CLEANLINESS

Section 40. The occupant or tenant of every dwelling and each apartment in a two-family dwelling, or the lessee or conductor of every rooming house, and the conductor of every tenement house, shall keep the same and every part thereof, and the yards, courts, shafts exclusively belonging thereto, free from all accumulations of dirt, filth, garbage, or other refuse matter. The owner of such building, when notified by the chief of the division, shall see that every part thereof, and all cellars, halls, passages, walls, areas, yards, courts, and spaces appurtenant thereto, are kept free from all accumulations of dirt, filth, garbage, or other refuse matter. Any person who shall cause or permit any filth, refuse, or perishable matter to be cast into a shaft, court, or area or yard, in or about such building, or shall commit any other nuisance in or about such building, shall be subject to the penalty hereinafter provided for violations of this act.

GARBAGE AND ASH RECEPTACLES

Section 41. The occupant or tenant of every dwelling, and of each apartment in a two-family house, the lessee or conductor of every rooming house, and the conductor of every tenement house, shall pro-

vide for each apartment under his supervision a suitable non-absorbent, non-leakable, covered receptacle for garbage, and a receptacle of approved kind for ashes. All occupants or tenants of buildings of the foregoing classes shall securely bundle all rubbish, waste paper, and like refuse, in such manner as to prevent it from causing a nuisance upon the property or upon the street when the collectors are taking it away. Garbage chutes shall not be constructed, maintained, nor used. Contractors or others removing refuse or other waste shall so handle it as to prevent it from escaping or becoming a nuisance on or to other properties or the public street.

REPAIRS

Section 42. Every building of the grades referred to in this act, and all parts thereof, shall be kept in good repair and the walls damp proof. All rain water shall be so drained and carried from such building as to prevent its dripping to the ground, or causing dampness in the walls, ceilings, yards, courts, or other areas, or in those of adjoining properties.

THE BUREAU OR BOARD OF HEALTH TO MAKE RULES AND REGULATIONS

Section 43. It shall be the duty of the Bureau or Board of Health, and it is hereby empowered, to make such additional rules and regulations governing the use, occupancy, and sanitation and maintenance of the buildings of the grades referred to in this act, the ground surrounding the same, and of unoccupied lands, as may from time to time be deemed necessary. All such rules and regulations shall be approved by select council and promulgated by advertising, three times in each of two newspapers published in cities of the first class, a notice that such rules and regulations have been adopted, and where copies thereof may be had. Such rules and regulations shall be printed, and shall be furnished free, upon application to the Bureau of Health. It shall be the duty of the Division of Housing and Sanitation to enforce said rules and regulations and the provisions of this act.

PROVISIONS FOR ENFORCING THE ACT

Section 44. On and after the passage of this act, no building shall be occupied or permitted to be occupied as a rooming house or tenement house unless the owner or lessee of such building, or the conductor of such tenement, shall have first made application to the Bureau or Board of Health for a license therefor. Such application shall be made in writing, and shall state the nature and extent of the applicant's interest in the property, the name and address of the owner or his agent, the location of the building, the use to which it is to be put, and the number of rooms to be occupied. Each application shall be accompanied by a fee of two dollars ($2.00) for each rooming house, and, for a tenement house, fifty cents ($.50) for each apartment that is to be occupied for living purposes. The license shall be granted, without further charge, by the chief of the division, after he has inspected the premises and certified that the provisions of this act and the rules and regulations of the Bureau or Board of Health have been complied with. Said license shall be for the remainder of the calendar year, and may be revoked for cause.

APPEALS

Section 45. Any person whose application for a license has been refused or revoked, or who may be aggrieved by any order or notice issued, or decision by the chief of the division or of any other official, or by any department, bureau or board having to do, or assuming to have to do, with and in the enforcement of this act or of any rules or regulations made in accordance therewith, may appeal therefrom, within fifteen (15) days thereafter, to the court of common pleas of the proper county; and such appeal shall not supersede any such notice, order, or decision pending the entry of a final decree thereabout, unless so ordered by the court.

INSPECTIONS

Section 46. The chief of the division and his duly accredited inspectors may enter and examine on any weekday, between the hours of eight ante meridian and five post meridian, all houses or other premises within the provisions of this act. Such inspectors shall then wear a prescribed uniform, and show a suitable badge and certificate of authority signed by the Director of Public Health and Charities. No person shall hinder such chief or any such inspector in the performance of his duty.

LICENSES TO BE DISPLAYED

Section 47. On and after the passage of this act it shall be unlawful for any person to let, rent, lease, or conduct any tenement house or rooming house, in any city of the first class, unless a license therefor has been issued by the Bureau or Board of Health, in accordance with the provisions of section forty-four of this act, and unless such license is at all times displayed in a conspicuous place upon the walls within and close to the outer entrance of the house.

PENALTIES

Section 48. Any person who shall violate any of the provisions of this act, or who shall interfere with an inspector of the Division of Housing and Sanitation in enforcing the provisions of this act, or of any law of the Commonwealth, or ordinance of the city of the first class, or rule and regulation of the Bureau or Board of Health, that has been approved by select councils and advertised in the manner provided for in this act, shall for every such offense, upon conviction thereof in a summary proceeding before any magistrate of said city in which said offense was committed, be subject to a fine of not less than five dollars ($5.00) or more than fifty dollars ($50.00), with costs of prosecution, for the first offense; and, for a second or subsequent offense, to a fine of not less than twenty-five dollars ($25.00) or more than two hundred dollars ($200.00), and costs of prosecution, or by imprisonment for not more than sixty days, or by both, at the discretion of the court. All fines so imposed and collected to be paid into the treasury of the said city.

NOTICES AND LIENS

Section 49. Notices requiring compliance with this act shall be served upon the person required to make such compliance, or his agent, unless otherwise herein provided, by mailing a copy to the residence, if known, of such person or his agent; and, if unknown, by posting a copy in a conspicuous place upon the premises affected, which notice shall not be removed or defaced while the condition mentioned therein exists.

All notices shall be complied with within such period, not exceeding thirty days, as the Bureau or Board of Health may determine; and, upon failure to comply, the Bureau or Board of Health may contract to have the necessary work done; and the cost thereof shall be made a lien against such property, and collectible as now provided by law: Provided, however, That if there shall be no funds at the disposal of such Bureau or Board of Health for the aforesaid purpose, the Bureau or Board of Health may contract and have such work done, and the lien therefor shall be marked to the use of the contractor doing the work, and shall be collectible by such contractor as is now provided by law in similar cases: Provided further, That the owner of the property may, by permission of the Department of Public Health and Charities, pay the amount of the lien thereon in five equal yearly parts, with interest at the rate of five per cent.

REPEALER

Section 50. An act approved the twenty-second day of July, one thousand nine hundred and thirteen (Pamphlet Laws, eight hundred seventy-nine), entitled "An act to protect the public health and safety; by regulating the erection, alteration, repair, use, occupancy, maintenance, sanitation, and condemnation of dwellings, two-family dwellings, rooming houses and tenements; by regulating the use, maintenance, and sanitation of the ground surrounding the same, the adjoining buildings, and all vacant land, in cities of the first class; providing for their inspection, the abatement of nuisances, the vacating and destroying of uninhabitable houses, and the filing of liens; creating a Division of Housing and Sanitation; providing for institution of prosecutions and penalties for violations of the provisions thereof; and repealing laws inconsistent therewith," and all other acts, or parts of acts, inconsistent with this act, be and the same are hereby repealed.

PROVISO

Section 51. All of the provisions of this act shall take effect immediately: Providing, however, That licenses and permits issued for the year one thousand nine hundred and fifteen, under any existing laws, for any of the subject-matter for which licenses are to be issued under this act, shall be valid until the thirty-first day of December, one thousand nine hundred and fifteen.

Approved—The 3d day of June, A. D., 1915.

MARTIN G. BRUMBAUGH.

The foregoing is a true and correct copy of the Act of the General Assembly No. 420.

CYRUS E. WOODS
Secretary of the Commonwealth.

No. 267

AN ACT

To amend section thirteen of an act, approved the third day of June, one thousand nine hundred and fifteen (Pamphlet Laws, nine hundred and fifty-four), entitled "An act to protect the public health and safety: By regulating the erection, alteration, repair, use, occupancy, maintenance, sanitation, and condemnation of dwellings, two-family dwellings, rooming houses, and tenements; by regulating the use, maintenance, and sanitation of the grounds surrounding the same,

the adjoining buildings, and all vacant land in cities of the first class; providing for their inspection, the abatement of nuisances, the vacating of uninhabitable houses, and the filing of liens; creating a Division of Housing and Sanitation; and providing penalties for violations of the provisions thereof; and repealing all laws inconsistent therewith."

Section 1. Be it enacted, &c., That section thirteen of an act, approved the third day of June, one thousand nine hundred and fifteen (Pamphlet Laws, nine hundred and fifty-four), entitled "An act to protect the public health and safety: By regulating the erection, alteration, repair, use, occupancy, maintenance, sanitation, and condemnation of dwellings, two-family dwellings, rooming houses, and tenements; by regulating the use, maintenance, and sanitation of the grounds surrounding the same, the adjoining buildings, and all vacant land in cities of the first class; providing for their inspection, the abatement of nuisances, the vacating of uninhabitable houses, and the filing of liens; creating a Division of Housing and Sanitation; and providing penalties for violations of the provisions thereof; and repealing all laws inconsistent therewith," which reads as follows:—

Section 13. "No part of any room, in any building of the grades referred to in this act, shall be enclosed or subdivided, in whole or in part, by a fixed or movable partition, or other contrivance or device, unless such part of the room, so enclosed or subdivided, shall contain a separate window as herein required for ordinary rooms, and shall have a floor area of not less than seventy square feet," is hereby amended to read as follows:—

Section 13. No part of any room, in any building of the grades referred to in this act, shall be enclosed or subdivided, in whole or in part, by a fixed or movable partition, or other contrivance or device, unless such part of the room, so enclosed or subdivided, shall contain a separate window as herein required for ordinary rooms, and shall have a floor area of not less than seventy square feet: *Provided, That rooms used solely for kitchens, kitchenettes, bath rooms, laundries, water closet compartments shall be exempt from the provisions of this section with reference to floor area: Provided further, That all kitchens, kitchenettes, bath rooms, laundries, and water closet compartments shall be equipped for the purpose for which the room is planned.*

Approved—The 16th day of May, A. D. 1921.

WM. C. SPROUL.

The foregoing is a true and correct copy of the Act of the General Assembly No. 267.

CYRUS E. WOODS
Secretary of the Commonwealth.

No. 457

AN ACT

To enable cities, incorporated towns, boroughs, and townships of the first class to govern and regulate by ordinance the construction, alteration, repairs, occupation, maintenance, sanitation, lighting, ventilation, water supply, toilet facilities, drainage, use and inspection of all buildings used for human habitation and land appurtenant thereto; and providing for the enforcement of such ordinances.

Section 1. Be it enacted, &c., That in addition to other remedies provided by law, and in order to promote the public health, safety, morals, and the general welfare, all cities, incorporated towns, boroughs,

and townships of the first class in this Commonwealth are hereby authorized and empowered to enact and enforce suitable ordinances to govern and regulate the construction, alteration, repairs, occupation, maintenance, sanitation, lighting, ventilation, water supply, toilet facilities, drainage, use and inspection of all buildings or parts of buildings constructed, erected, altered, designed, or used in whole or in part for human habitation, and of the sanitation and inspection of land appurtenant thereto; and the said ordinances may provide proper penalties, not exceeding five hundred ($500) dollars, for the violation of their provisions.

Section 2. In case any building or structure is constructed, reconstructed, altered, repaired, converted, or maintained, or any building or land is used, in violation of any ordinance enacted under authority conferred hereby, the corporate authorities of the city, incorporated towns, borough, or township of the first class, in addition to the penalties provided by ordinances enacted herewith, may institute appropriate actions or proceedings at law or in equity to prevent and restrain such unlawful construction, reconstruction, alteration, repairs, conversion, maintenance, or use, and to restrain, correct, or abate such violation and to prevent the occupancy of said building or structure.

Section 3. The ordinances enacted pursuant to this act shall not be inconsistent with the provisions of any statute governing the same matter; but all regulations prescribed by such ordinances, which are additional or supplementary to the statute law and not inconsistent therewith, or enacted for the purpose of carrying into effect the provisions of the statute law, shall be valid and binding.

Section 4. All acts or parts of acts, and all laws, inconsistent herewith are hereby repealed.

Approved—The 11th day of May, A. D. 1927.

JOHN S. FISHER

The foregoing is a true and correct copy of Act of the General Assembly No. 457.

CHARLES JOHNSON
Secretary of the Commonwealth.

PLUMBING AND HOUSE DRAINAGE

Licensing and Registration of Plumbers

No. 272

AN ACT

Providing for the examination, licensure, and registration of persons, firms, or corporations engaged or engaging in the business or work of plumbing or house drainage, and prescribing certain rules, regulations, and requirements for the construction of plumbing, house drainage, and cesspools in cities of the first class, and imposing fines, penalties, and forfeitures for violation thereof.

Section 1. Be it enacted, &c., That on and after the first day of January (1912), nineteen hundred and twelve, it shall not be lawful for any person to carry on or work at the business of plumbing or house drainage in cities of the first class, having a system of sewerage, and water supply, of this Commonwealth, until a certificate or license to engage in or work at said business shall have been granted said persons by the Director of the Department of Public Health and Charities, or the Department or Bureau or Board of Health, of such cities; nor until

they have registered as such in the office of the Board or Bureau of Health of said cities: Provided, however, That nothing in this act shall be construed to prevent the employment or working of apprentices, under the direction of duly registered and licensed master or employing plumbers: And provided further, That master or employing plumbers, duly registered and licensed, and having a bona fide place of business in said cities of the first class at the time of the passage of this act, and journeymen plumbers who have served not less than four years apprenticeship, shall not be required to undergo any examination, and they shall be entitled to register; provided said persons, firms, or corporations register prior to January first, one thousand nine hundred and twelve, and annually thereafter between the first and thirty-first days of December of each year, as per section two of this act.

Section 2. All and every person or persons, engaged or engaging in the business or work of plumbing and house drainage in cities, shall apply in writing to the said Director of the Department of Public Health and Charities, Department or Board or Bureau of Health, for such certificate or license; and if, after proper examination made by the board or bureau of health of said cities, such person or persons so applying shall be found competent, the same shall be certified to the Director of Public Health and Charities, Department or Board or Bureau of Health, who shall thereupon issue a certificate or license to such persons, which shall for the period of one calendar year, or fractional part thereof next ensuing the date of such examination, entitle him or them to engage in or work at the business of plumbing and house drainage.

A register of all such applicants and the license or certificates issued shall be kept in said department, which said register shall be open to the inspection of all persons interested therein.

The Director of the Department of Public Health and Charities is hereby authorized to appoint a board of examiners, to consist of the Health Officer or Superintendent of the Department or Board or Bureau of Health, one plumbing inspector, and two competent plumbers in no wise connected with the city government, who shall examine all applicants for license under the provisions of this act. The said board shall make all reasonable rules, regulations, and examinations, which shall be approved by the said Director of the Department of Public Health and Charities. An examination of any one member of a firm or corporation, or of the superintendent or foreman thereof, shall be deemed sufficient.

Said person or persons, firm or corporation, engaged or engaging in the business of plumbing or house drainage, shall pay for each examination the sum of five dollars, and each journeyman or person engaged in the work shall pay the sum of fifty cents, which sum shall be paid into the city treasury, for the use of said cities. The proper officers of said cities are hereby authorized to pay the plumbers acting on said board the sum of five dollars per day for each day or session thus actually employed.

Every registered master plumber shall have a bona fide place of business in said cities, and shall display on the front of his or their place of business a sign "Registered Plumber," bearing the name or names of the person, firm, or corporation, in letters not less than three inches high.

No person other than a registered master plumber shall be allowed to carry on or engage in the business; nor shall any person or persons expose the sign of plumbing or house drainage, or any advertisement pertaining thereto, unless he or they have first secured a license or certificate and been registered in the office of the Board or Bureau of Health of such cities; nor shall any person or persons other than a registered master plumber—or person in his or their employ, or under his or

their supervision—be allowed to alter, repair, or make any connection with any drain, soil, waste, or vent pipe, or any pipe connected therewith.

Every registered master plumber, firm, or corporation shall give immediate notice of any change in his, their or its place of business; and upon his, their, or its retirement from business shall surrender his, their, or its certificate of registry to the Board or Bureau of Health. Every person, firm, corporation, or representative thereof, in registering, shall give the full name or names of the person, firm, or officers' names of the corporation, for which he or they shall register.

At the expiration of each calendar year said certificate or license shall be null and void. A licensed master or journeyman plumber desiring to continue in or work at the business of plumbing and house drainage for the ensuing year shall, between the first and thirty-first days of December of each year, surrender the said certificate or license for the current year to the Department or Board or Bureau of Health, and re-register his, their, or its name or names, and business or home address, upon such form or forms as may, from time to time, be furnished by said Department or Board or Bureau of Health.

A re-examination will not be necessary for re-registration unless the licensed master or journeyman plumber should have failed to make application for re-registration at the specified time. The sum of one dollar shall be paid by master plumbers, firms, or corporations, and the sum of twenty-five cents by journeymen plumbers, for re-registration, which sum shall be paid into the city treasury, for the use of said cities. A register of all such applicants and license or certificates issued shall be kept in said Department, Board or Bureau of Health, which said register shall be open to the inspection of all persons interested therein. Any person, firm, or corporation holding a license or certificate, granted by any first, second, or third-class city of this Commonwealth, to engage in or work at the business of plumbing and house drainage, desiring to do plumbing and drainage work in any other city than the one in which said license or certificate was granted, shall, without examination, be registered before entering upon such work: Provided, however, That such registration shall be restricted and limited to such plumbing and drainage work as he, they, or it shall have contracted for at the time of registry. On the completion of such contract or contracts the registration of such person, firm, or corporation shall be null and void, and no further permit shall be issued to such person, firm, or corporation until he, they, or it shall have first registered his or its name, or their names and addresses, as hereinbefore provided.

Section 3. From and after the passage of this act, the construction of plumbing, house drainage, and cesspools shall be conducted only under and in accordance with the following rules, regulations, and requirements, namely:—

Section 4. There shall be a separate plan for each building, public or private, or any addition thereto or alterations thereof, accompanied by specifications showing the location, size and kind of pipe, traps, closets, and fixtures to be used, which plans and specifications shall be filed with the Board or Bureau of Health. The said plans and specifications shall be furnished by the architect, plumber, or owner, and filed by the plumber. All applications for change in plans must be made in writing.

Section 5. Plumbers before commencing the construction of plumbing work in any building in the said cities (except in case of repairs, which are here defined to relate to the mending of leaks in soil, vent, or waste pipes, faucets, valves, and water supply pipes, and shall not be construed to admit of the replacing of any fixture, such as water closet,

bath tubs, wash stands, sinks, et cetera, or the respective traps for such fixtures), shall submit to the Board or Bureau of Health plans and specifications, legibly drawn in ink, on blanks to be furnished by said board or bureau. Where two or more buildings are located together and on the same street, and the plumbing work is identical in each, one plan will be sufficient. Plans will be approved or rejected within twenty-four hours after their receipt.

Section 6. It shall be the duty of every person constructing or owning any drain, soil pipe, passage or connection, between a sewer and any ground, building, erection, or place of business, and in like manner the duty of the owners of all grounds, buildings, erections, and of all parties interested therein or thereat, to cause and require that such drain, soil pipe, passage, or connection shall be adequate for its purpose, and shall at all times allow to pass freely all material that enters or should enter the same; and no change or drainage, sewerage, or the sewer connections of any house shall be permitted, unless notice thereof shall have been given the Board or Bureau of Health and assent thereto obtained in writing.

Section 7. Drainage, sewerage, or plumbing work must not be covered or concealed in any manner until after it is inspected and approved by the Board or Bureau of Health. Notice must be given said board or bureau, upon blanks to be furnished by it, when the work is sufficiently advanced for such inspection; when it shall be the duty of the proper officers to inspect the same within three days after receipt of said notice.

Section 8. The main drainage system of every house or building shall be separately and independently connected with the street sewer, where such sewer exists; but where there is no sewer in the street, and it is necessary to construct a private sewer to connect with sewer on adjacent street, such plans may be used as may be approved by the Department or Board or Bureau of Health, but in no case shall joint drains be laid in cellars, parallel with the street or alley.

House drains or soil pipes, laid beneath floors, must be of extra heavy cast-iron pipe (as per table in section sixteen), with leaded and caulked joints, and carried five feet outside cellar wall. All drains or soil pipes connected with main drain where it is above the cellar floor shall be of extra heavy cast-iron pipe, with leaded and caulked joints, or of heavy wrought-iron pipe, with screw joints properly secured, and carried five feet outside cellar wall; and all arrangements of soil or waste pipes shall be as direct as possible. Wrought-iron pipes shall be asphalted, galvanized, or otherwise made rustless. Changes of direction on pipes shall be made with "Y" branches, both above and below the ground, and where such pipes pass through a new foundation wall, a relieving arch shall be built over it, with a two-inch space on either side of main pipe.

The size of the main house drain shall be determined by the total area of the buildings and paved surfaces to be drained, according to the following table, if iron pipe is used. If the pipe is terra-cotta, the diameter shall be one size larger for the same amount of area drainage:

Diameter	Fall ¼ Inch Per Foot	Fall ½ Inch Per Foot
4 inches	1,800 square feet drainage area	2,500 square feet drainage area
5 inches	3,000 square feet drainage area	4,500 square feet drainage area
6 inches	5,000 square feet drainage area	7,500 square feet drainage area
8 inches	9,100 square feet drainage area	13,600 square feet drainage area
10 inches	14,000 square feet drainage area	20,000 square feet drainage area

The main house drains may be decreased in diameter beyond a rain water conductor or surface inlet by permission of the Department or Board or Bureau of Health, when the plans show that conditions are such as to warrant such decrease; but in no case shall the main house drain be less than four (4) inches in diameter.

The walls for pit where one closet is installed may be four inches in thickness, or salt glazed sewer pipe, thirty-six inches in diameter, may be used. Where pit is for more than one closet, the walls shall be nine inches in thickness. The soil pipe and traps used inside pit must be extra heavy cast iron, and the trap to have a hand hole for cleanout purposes, with cleanout caulked in. If the closet is located in the rear of a soil or vent pipe, the drain on which it is located shall be vented with a four-inch pipe, carried above roof of closet, away from any opening or window. All outside closets shall be of the tank pattern. The water to be supplied to tank through automatic seat-action valve. The waste from valve may be permitted to discharge on cement floor of pit, which shall be provided with four-inch trap and strainer. The enclosure of yard water closets shall be ventilated by slatted openings, and there shall be a trap door of sufficient size to permit of convenient access to the hopper pit.

Section 9. The house drain must be provided with a horizontal trap, placed immediately inside the cellar wall. The trap must be provided with a hand hole for convenience in cleaning, the cover of which must be properly fitted and made gas and airtight, with heavy brass screw cap ferrule, caulked in. This class of traps shall be subject to the approval of the Board or Bureau of Health.

Section 10. A fresh air inlet must be connected with the house drain just inside of the house trap. Where underground, it must be of extra heavy cast iron. Said inlet must lead to the outer air, and finish with an automatic device approved by the Board or Bureau of Health, at a point just outside the front wall of building. The fresh air inlet must be of the same size as the drain, up to four inches. For five and six inch drains it must not be less than four inches in diameter; for seven and eight inch drains, not less than six inches in diameter, or its equivalent; and for larger drains, not less than eight inches in diameter, or its equivalent.

Section 11. House sewers and house drains must, where possible be given an even grade to the main sewer of not less than one-quarter of an inch per foot.

Section 12. When main sewer is not located on street, house sewers must be constructed on outside of building, and branch into each house separately, and in no case will the sewer from one house to another be permitted to run through cellars.

Section 13. Where the ground is of sufficient solidity for a proper foundation, cylindrical terra-cotta pipe of the best quality, free from flaws, splits, or cracks, perfectly burned, and well glazed over the entire inner and outer surfaces, may be used, if laid on a smooth bottom, with a special groove cut in the bottom of the trench for each hub, in order to give the pipe a solid bearing on its entire length, and the soil well rammed on each side of the pipe. The spigot and hub ends shall be connected. The space between the hub and pipe must be thoroughly filled with cement mortar, made of equal parts of the best American natural cement and bar sand, thoroughly mixed dry, and enough water afterwards added to give proper consistency. The mortar must be mixed in small quantities, and used as soon as made. The joints must be carefully wiped out and pointed, and all mortar that may be left inside removed, and the pipe left clean and smooth throughout, for which purpose a swab may be used. It must not be laid closer than five feet to any exterior wall of a building, or less than three and one-half feet be-

low the surface of the ground, or when the sewer passes near a well, nor will it be allowed in bad or made ground.

Section 14. Where a sewer is laid between buildings, in a passage-way, alley, or courtyard, at a less distance than five feet from the buildings, it must be constructed of extra heavy cast-iron pipe, for a distance corresponding to the length of the foundation of said buildings.

Section 15. Floor or other drains will only be permitted when it can be shown, to the satisfaction of the Board or Bureau of Health, that their use is absolutely necessary, and arrangements made to maintain a permanent water seal in the traps, and be provided with check or back-water valves.

Section 16. All cast-iron pipes must be sound, free from holes, and of a uniform thickness, known as "extra heavy" pipe, and corresponding fittings will be required. The pipe must be tested to fifty pounds water pressure, and marked with the maker's name.

Pipes shall weigh as follows, namely:

Two-inch pipe, five and one-half pounds per lineal foot.
Three-inch pipe, nine and one-half pounds per lineal foot.
Four-inch pipe, thirteen pounds per lineal foot.
Five-inch pipe, seventeen pounds per lineal foot.
Six-inch pipe, twenty pounds per lineal foot.
Seven-inch pipe, twenty-seven pounds per lineal foot.
Eight-inch pipe, thirty-three and one-half pounds per lineal foot.
Ten-inch pipe, forty-five pounds per lineal foot.
Twelve-inch pipe, fifty-four pounds per lineal foot.

Section 17. Sub-soil drains must discharge into a sump or receiving tank, the contents of which must be lifted and discharged into the drainage system above the cellar floor by some approved method. When directly sewer connected, they must be cut off from the rest of the plumbing system by a brass flap-valve on the inlet to the catch basin, and the trap on the drain from the catch basin must be water supplied, as required for cellar drain.

Section 18. All yards, areas, and courts must be drained. Tenement houses and lodging houses must have the yards, areas, and courts drained into the sewer. These drains, when sewer connected, must have connection not less than four inches in diameter. They should be controlled by one trap—the leader trap, if possible.

Section 19. Old house drains and sewers may be used, in connection with new buildings or new plumbing, only when they are found, on examination by the Board or Bureau of Health, to conform in all respects to the requirements governing new sewers and drains. All extensions to old house drains must be of extra heavy cast-iron pipe.

Section 20. All buildings shall be kept provided with proper metallic leaders, for conducting water from the roofs in such manner as shall protect the walls and foundations of said building from injury. In no case shall the water from said leaders be allowed to flow upon the sidewalk, but the same shall be conducted by a pipe or pipes to the sewer. If there be no sewer in the street upon which such buildings front, then the water from said leaders shall be conducted, by proper pipe or pipes below the surface of the sidewalk, to the street gutter.

Section 21. Inside leaders must be constructed of cast iron, wrought iron, or steel, with roof connections made gas and water tight by means of a heavy lead or copper-drawn tubing, wiped or soldered to a brass ferrule, or nipple caulked, or screwed into the pipe. The tubing must extend at least seven (7) inches into iron leader pipe. Outside leaders may be sheet metal, but they must connect with the house drain by means of a cast-iron pipe extending vertically five (5) feet above the grade level.

Section 22. All leaders must be trapped with cast-iron running traps, so placed as to prevent freezing.

Section 23. Rain-water leaders must not be used as soil, waste or vent pipes, nor shall such pipes be used as a leader.

Section 24. No steam exhaust, blow-off, or drip pipe, shall connect with a sewer or house drain leader, soil pipe, waste or vent pipe. Such pipes must discharge into a tank or condenser, from which suitable outlet to the sewer shall be made. Such condensers shall be water supplied, to help condensation and protect the sewer, and shall also be supplied with relief vent to carry off dry steam.

Section 25. The smallest diameter of any soil pipe permitted to be used shall be four-inch. The size of soil pipes must be not less than those set forth in the following tables:

Maximum number of fixtures connected to—

Size of pipe	Soil and Waste Combined		Soil Pipe Alone	
	Branch	Main	Branch	Main
4 in.	48 fixtures	96 fixtures	8 waterclosets	16 waterclosets
5 in.	96 fixtures	192 fixtures	16 waterclosets	32 waterclosets
6 in.	298 fixtures	336 fixtures	34 waterclosets	68 waterclosets

If the building is six (6), and less than twelve (12), stories in height, the diameter shall be not less than five (5) inches; if more than twelve (12) stories, it shall be six (6) inches in diameter. A building six or more stories in height, with fixtures located below the sixth floor, soil pipe four (4) inches in diameter will be allowed to extend through the roof; provided the number of fixtures does not exceed the number given in the table.

All soil pipes must extend at least two feet above the highest window, and must not be reduced in size. Traps will not be permitted on main, vertical, soil, or waste lines. Each house must have a separate line of soil and vent pipes. No soil or waste line shall be constructed on the outside of a building.

Fixtures with—

One and one-quarter traps, count as one fixture.

Two-inch traps, count as two fixtures.

Two and one-half traps, count as three fixtures.

Three-inch traps (water closets), count as four fixtures.

Four-inch traps, count as five fixtures.

Section 26. All sewer, soil, and waste pipes must be as direct as possible. Changes in direction must be made with "Y" or half "Y" branches, or one-eighth bends. Offsets in soil or waste pipes will not be permitted when they can be avoided; nor, in any case, unless suitable provision is made to prevent accumulation of rust or other obstruction. Offsets shall be made with forty-five degree bends, or similar fittings. The use of T-"Ys" (sanitary T's) will be permitted on upright lines only.

Section 27. Joints in cast-iron pipes and soil and waste pipes must be so filled with oakum and lead, and hand caulked, as to make them gas tight. Connections of lead and cast-iron pipes must be made with brass sleeve or ferrule, of the same size as the lead pipe inserted in the hub of the iron pipe, and caulked with lead. The lead pipe must be attached to the ferrule by wiped joint. Joints between lead and wrought-iron pipes must be made with brass nipple, of same size as lead pipe. The

lead pipe must be attached to the nipple by wiped joint. All connections of lead waste pipe must be made by means of wiped joints.

Section 28. Every sink, bath tub, basin, water closet, slop hopper, or fixtures having a waste pipe, must be furnished with a trap, which shall be placed as close as practicable to the fixture that it serves, and in no case shall they be more than one foot from said fixture. The waste pipe from the bath tub or other fixtures must not be connected with a water-closet trap.

Size of Horizontal and Vertical Waste-pipe Traps and Branches:

Horizontal and Vertical	Number of Small Fixtures
1¼ inches	1
1½ inches	2
2 inches	3 to 8
2½ inches	9 to 20
3 inches	21 to 44

If building is ten (10) or more stories in height, the vertical waste pipe shall not be less than three (3) inches in diameter. The use of wrought-iron pipe for waste pipe two inches or less in diameter is prohibited.

The size of traps and waste branches, for a given fixture, shall be as follows:

Kind of Fixtures	Size in Inches	
	Trap	Branch
Water closet	3	4
Slop sink with trap combined	3	3
Slop sink, ordinary	2	2
Pedestal urinal	3	3
Floor drain, or wash	4	4
Yard drain, or catch basin	4	4
Urinal trough	2	2
Laundry traps (2 or 5)	2	2
Combination sink and tray (for each fixture)	1½	2
Kitchen sinks (small) for dwellings	1½	1½
Kitchen sinks (large) hotels, restaurants, grease traps	..	2
Pantry sinks	1½	1½
Wash basin, one only	1¼	1¼
Bath tubs, 4 x 10 inches drum trap	.	1½
Shower baths	1½	1½
Shower baths (floor)	2	2
Sitz baths	1½	1½
Drinking fountain	1¼	1¼

Section 29. Overflow pipes from fixtures must, in all cases, be connected on the inlet side of traps.

Section 30. Sediment pipes from kitchen boilers must not be connected on the outlet side of traps.

Section 31. All traps must be well supported, and set true with respect to their water levels. The size for traps must not be less than those given in the following:

Nationally advertised building products are listed in the Classified Building Trade Directory under their trade names.

Traps for water closets, four inches in diameter.

Traps for slop sinks, one and one-half inches to three inches in diameter.

Traps for kitchen sinks, one and one-half inches in diameter.

Traps for wash trays, two inches in diameter.

Traps for (bowl) urinals, one and one-half inches in diameter.

Traps for washstands, one and one-fourth inches in diameter. All bath tubs shall be supplied with drum trap, not less than three inches in diameter, with three-inch trap screws on floor line. In cases where an additional fixture is required in a building, and it is impossible to get re-vent pipes for the trap, the Board or Bureau of Health shall designate the kind of trap to be used. This shall not be construed to allow traps without re-vents in new buildings.

Section 32. Safe waste pipes must not connect directly with any part of the plumbing system. Safe waste pipes must discharge over an open, water supplied, publicly placed, ordinarily used sink, placed not more than three and one-half feet above the cellar floor. The safe waste from a refrigerator must be trapped at the bottom of the line only, and must not discharge upon the ground floor, but over an ordinary portable pan, or some properly trapped, water supplied sink, as above. In no case shall the refrigerator waste-pipe discharge over a sink located in a room used for living purposes.

The branches on vertical lines must be made by "Y" fittings, and be carried to the safe with as much pitch as possible. Where there is an offset on a refrigerator waste pipe in cellar, there must be clean-outs to control the horizontal part of the pipe.

In tenement and lodging houses the refrigerator waste pipes must extend above the roof, and not be larger than one and one-half inches, nor the branches less than one and one-quarter inches. Refrigerator waste pipes, except in tenement houses, and all safe waste pipes, must have brass flap valves at their lower ends. Lead safes must be graded, and neatly turned over beveled strips at their edges.

Section 33. All vent pipes must be either of lead, brass, loricated porcelain, enameled iron, or galvanized iron pipe.

Section 34. All traps shall be protected from siphonage or air pressure by special vent pipes, of a size not less than the following tables:

Size of Pipe	Maximum Developed Length in Feet	Number of Traps Vented	
	Mains	Branch	Main Vertical
1¼ inch vent	20	1	
1½ inch vent	40	2 or less	
2 inch vent	65	10 or less	20 or less
2½ inch vent	100	20 or less	40 or less
3 inch vent	10 or more stories	60 or less	100 or less

The branch vent pipes shall be not less than the following sizes: One and one-fourth inches in diameter, for one and one-fourth inch traps. One and one-half inches in diameter, for one and one-half inch to two and one-half inch traps. Two inches in diameter, for three-inch to four-inch traps. One-half their diameter, for traps five inches and over.

Where two (2) or more water closets are placed side by side on a horizontal branch, the branch line shall have a relief extended as a loop vent. A pipe two (2) inches in diameter will be sufficient as a loop vent for two (2) closets. A pipe three (3) inches in diameter shall be used as a relief for three (3) or four (4) closets; and where more than four (4) closets are located on the same branch the relief shall not be less than (4) inches in diameter. All house drains and soil lines on which a water closet is located must have a four-inch main vent line. Where an additional closet is located in the cellar or basement, and within ten feet of main soil or vent line no relief vent will be required for said closet; but where it is more than ten (10) feet, a two-inch vent line will be required. Relief vent pipes for water closets must not be less than two inches in diameter, for a length of forty feet, and not less than three inches in diameter for more than forty feet.

No revent from traps under bell traps will be required.

Any building having a sewer connection with a public or private sewer used for bell trap connections or floor drainage only, a two-inch relief line must be extended to the roof of building from rear end of main drain. House drains constructed for roof drainage only, will not require a relief vent.

A floor trap for a shower shall be vented, unless located in cellar or ground floor, the paving of which renders the trap inaccessible. If the number of these fixtures on a branch is two (2) or more, the waste line shall be extended as a loop vent, instead of back venting the separate traps; and when located in basement floor, they shall be provided with a removable strainer or cleanout. Back vent pipes, from traps above the floor, must either be connected with crown of trap with ground-in brass coupling or if connected solidly to trap, must have a ground-in brass coupling at wall.

Section 35. Where rows of fixtures are placed in a line, fittings of not less than forty-five (45) degrees to the horizontal must be used on vent lines to prevent filling with rust or condensations; except on brick or tile walls, where it is necessary to channel same for pipes, ninety (90) degree fittings will be allowed. Trapped vent pipes are strictly prohibited. No vent pipe from house side of any trap shall connect with ventilation pipe, or with sewer, soil, or waste pipe. Vent pipes from several traps may be connected together, or may be carried into the main vent line above the highest fixture. Where one vertical vent line connects with another, a "Y" fitting must be used. Branch vent pipes must be connected as near to crown of the trap as possible.

Section 36. All offsets on vent line must be made at an angle of not less than forty-five degrees to the horizontal, and all lines must be connected at the bottom with a soil or waste pipe, or the drain, in such manner as to prevent the accumulation of rust, scale, or condensation.

Section 37. Rubber connections for back vents will not be permitted, without double coupling and thimble inside.

Section 38. No brick, sheet metal, or earthen ware flue, or chimney flue, shall be used as a sewer ventilator, or to ventilate any trap, drain, soil, or waste pipe.

Section 39. Soldering nipples must be extra heavy brass, or brass pipe, iron pipe size.

Section 40. Brass screw caps for cleanouts must be extra heavy, not less than one-eighth of an inch thick. The screw cap must have a solid square or hexagonal nut, not less than one inch high. The body

of cleanout ferrule must at least equal in weight and thickness the caulking ferrule for the same size pipe.

Section 41. Brass ferrules must be of best quality, bell shaped, extra heavy cast brass, not less than four inches long, and two and one-quarter inches, three and one-half inches thick, and four and one-half inches in diameter, and not less than the following weights:

Diameter two and one-fourth inches, weight one pound.

Diameter three and one-half inches, weight one pound twelve ounces.

Diameter four and one-half inches, weight two pounds eight ounces.

Section 42. The closet and all other fixtures must be set open, and free from all inclosing wood or other work. Where water closets will not support a rim seat, the seat must be supported on galvanized iron legs, and a drip tray must be used, which tray must be porcelain, enameled on both sides and secured in place. In tenement houses and lodging houses, sinks must be entirely open, set on iron legs or brackets, without any inclosing wood or other work.

Section 43. Pan, plunger, or hopper closets will not be permitted in any building. No range closets, either wet or dry, nor an evaporating system of closets, shall be constructed or allowed inside of any building. A separate building, constructed especially for the purpose, must be provided in which such range closets shall be set.

Section 44. All earthenware traps must have heavy brass floor plates, soldered to the lead bends and bolted to the trap flange, and the joint made permanently secure and gas tight.

Section 45. Water closets must not be located in sleeping apartments, nor in any room or compartment which has not direct communication with external air, either by window or air-shaft of at least four square feet.

Section 46. No water closets, except those placed in yards, and flushometer, volumeters, or similar devices shall be supplied directly from the supply pipes.

Section 47. All water closets must have flushing rim-bowls.

Water closets to be supplied from flushing tanks.

Section 48. Water closets within buildings shall be supplied with water from special tanks or cisterns, which shall hold not less than six gallons, when filled to the level of the overflow pipe, for each closet supplied, excepting automatic or siphon tanks, which shall hold not less than five gallons for each closet supplied. A group of closets may be flushed from one tank, but water closets on different floors must not be flushed from the same tank, except flushometers, volumeters, or similar devices. The water in said tanks must not be used for any other purpose.

Section 49. In no case will the water closet system of tenement or lodging houses be permitted in cellars, basements, or under sidewalks.

Section 50. In all sewer connected, occupied buildings there must be at least one water closet, and there must be additional closets so as there will never be more than fifteen persons per closet. In lodging houses, where there are more than fifteen persons on any floor, there must be an additional water closet on that floor for every fifteen additional persons, or fraction thereof.

Section 51. In tenement houses, lodging houses, factories, workshops, and all public buildings, the entire water closet apartments and side walls, to a height of sixteen inches from the floor, except at the door, must be made water-proof with asphalt, cement, tile, or other water-proof material, as approved by the Board or Bureau of Health. In tenement houses and lodging houses, the water closet

and urinal apartments must have a window or windows opening into the outer air of sufficient size, all of which shall be shown on plans, and shall be subject to the approval of the Board or Bureau of Health. Except that tenement or lodging houses, three stories or less in height, may have such window opening on a ventilating shaft, not less than ten feet square in area. In all buildings, the outer partition of such apartments must extend to the ceiling, or be independently ceiled over, and these partitions must be air-tight. The outside partitions must include a window opening to outer air on the lot whereon the building is situated; or some other approved means of ventilation must be provided. When necessary to properly light such apartments, the upper part of the partitions must be of glass. The interior partitions of such apartments must be dwarf partitions.

Section 52. All urinals must be constructed of materials impervious to moisture and that will not corrode under the action of urine. The floor and walls of urinal apartments must be lined with similar non-absorbent and non-corrosive material.

Section 53. The platforms or treads of urinal stalls must not be connected independently to the plumbing system, nor can they be connected to any safe waste pipe.

Section 54. Iron trough water closets and trough urinals must be porcelain, enameled, or galvanized cast iron.

Section 55. All water closets and other fixtures must be provided with a sufficient supply of water for flushing, to keep in a proper and cleanly condition.

Section 56. Water closets flush pipes must not be less than one and one-quarter inches, and urinal flush pipes one-half inch in diameter.

Section 57. The copper lining of water closets and urinal cisterns must not be lighter than twelve ounce copper, and must be stamped on lining with maker's name. Where lead is used for lining it must not weigh less than four pounds to the square foot. All other materials are prohibited.

Section 58. Wooden wash trays, sinks, or bath tubs are prohibited inside of buildings. Such fixtures must be constructed of non-absorbent material. Cement or artificial tubs will not be permitted, unless approved by the Board or Bureau of Health.

Section 59. Water closets when located in yard must be arranged as to be conveniently and adequately flushed, and the water supply pipes and traps protected from freezing by being placed in a hopper pit, at least four feet below the surface of the ground, the walls of which pit shall be constructed of hard burned brick or stone laid in cement or mortar, or of concrete, and traps used inside pit must be extra heavy cast iron, and the trap to have a hand hole for cleanout purposes. The closet drain to be vented, with a four-inch pipe and carried up above the roof of closet, away from any opening or window. The water shall be supplied through an automatic seat-action valve. The waste water from valve shall be conveyed to the sewer through a half-inch lead pipe, properly connected. The enclosures of yard water closets shall be ventilated by slatted openings, and there shall be a trap door in floor of sufficient size to permit of convenient access to the hopper pit.

Section 60. No privy vault or cesspools for sewage shall hereafter be constructed in any part of the city where a sewer is at all accessible, which shall be determined by the Department, Board or Bureau of Health; nor shall it be lawful to continue a privy vault or cesspool on any lot, piece, or parcel of ground abutting on or contiguous to any public sewer within the city limits. The Department or Board or Bureau of Health shall have the power to issue notice, giving at least three months' time to discontinue the use of any cesspool and have it

cleaned and filled up. No connection from any cesspool or privy vault shall be made with any sewer; nor shall any water closet or house drain empty into a cesspool or privy vault.

Section 61. In rural districts, or districts where no sewer exists, privy vaults shall not be located within two feet of party or street line, nor within twenty feet of any building. Before any privy vault shall be constructed, application for permission shall be made to the Department or Board or Bureau of Health, and such privy vault shall have nine-inch walls, constructed of hard burned brick, or stone, laid in cement mortar, or of concrete, with bottom and sides cemented so as to be water tight; size to be not less than four feet in diameter and six feet deep.

Section 62. All material used in the work of plumbing and drainage must be of good quality and free from defects. The work must be executed in a thorough and workmanlike manner.

Section 63. No person, firm, or corporation carrying on the business of plumbing and house drainage shall allow his or their name to be used by any person, directly or indirectly, either to obtain a permit or permits, or to do any work under his or their license.

Section 64. The term "private sewer" is applied to main sewers that are not constructed by and under the supervision of the department of public works.

The term "house sewer" is applied to that part of the main drain or sewer extending from a point five feet outside of the outer wall of a building, vault or area to its connection with public sewer, private sewer, or cesspool.

The term "house drain" is applied to that part of the main horizontal drain and its branches inside the walls of the building, vault or area, and extending to and connecting with the house sewer.

The term "soil pipe" is applied to any vertical line of pipe extending through the roof, receiving the discharge of one or more water closets, with or without other fixtures.

The term "waste pipe" is applied to any pipe extending through roof, receiving the discharge from any fixtures except water closets.

The term "vent pipe" is applied to any special pipe provided to ventilate the system of piping, and to prevent trap siphonage and back pressure.

Section 65. Whenever it shall come to the knowledge of the Department or Board or Bureau of Health, or complaint in writing shall be made by any citizen, that the plumbing or drainage in any building has become a nuisance or is contrary to the provisions and requirements of this act or the ordinances of the city, or is a faulty construction and liable to breed disease or endanger the health of the occupants, or upon the request of any owner or occupant of any building fitted with plumbing or drainage prior to the passage of this act, then the Department or Board or Bureau of Health shall direct the proper officer to examine the plumbing or drainage in any such building, and the said officer shall make a drawning of the plan of said plumbing, drainage, and sewer and ventilating shaft connections. He shall report his findings, in writing, to the Department or Board or Bureau of Health, and suggest such changes as are necessary to make the same conform to the rules governing such matters.

The Department or Board or Bureau of Health shall thereupon notify the owner or agent of any such building of the changes which are necessary to be made in said plumbing or drainage. Said changes shall be made within the time fixed by the Department or Board or Bureau of Health; and upon refusal or neglect to obey such orders, the Department or Board or Bureau of Health shall institute legal proceedings to have such changes made and said nuisance abated, by action before a justice of the peace or court of record; in which said action the

owner or agent of said building may show in defense that the plumbing or drainage was not a nuisance, or was not of faulty construction or out of repair, and in case of a building constructed subsequent to the passage of this act, said plumbing or drainage was not contrary to the provisions and requirements of this act or the ordinances of the city.

Section 66. When drain, soil, waste, vent and other pipes in the building, connected or to be connected with the sewer, have been placed in position, a preliminary water or air test of the same shall be applied, in the presence of an officer of the Board or Bureau of Health.

Section 67. When the work has been completed, a final notice shall be filed with the Board or Bureau of Health, when a final air or peppermint test shall be made in presence of said officer; when, if found satisfactory, a certificate of approval of the work will be issued; but no such plumbing or drainage work or system shall be used until said test has been made and certificate issued.

Section 68. When work is ready for inspection the plumbing contractor shall make such arrangements as will enable the proper officer to reach all parts of the building easily and readily, and also have present the proper apparatus and appliances for making said tests, and furnish such assistance as may be necessary to a proper application of the same.

Section 69. In case of any dispute or difference of opinion existing between the Department or Board or Bureau of Health and any person, firm, or corporation, as aforesaid, regarding the construction of plumbing, house drainage, or cesspools, the same shall be submitted by either party to the Director of the Department of Public Health and Charities, or the presiding officer of the Department or Board or Bureau of Health, who shall pass upon the same, and whose findings therein, after hearing, shall be final and conclusive upon all parties.

Section 70. Any person or persons who shall fail to comply with any of the provisions of this act, regarding the procuring of a license or certificate to engage in or work at the business of plumbing or house drainage, shall be liable to a fine of not less than ten dollars, nor exceeding fifty dollars, for each and every day he or they shall engage in or work at said business without first having obtained said certificate or license; and any person or persons who shall violate any of the rules, regulations, or requirements set forth in this act, regarding the construction, reconstruction or testing of plumbing, house drainage, or cesspools, shall be liable for every such offense to a fine of not less than ten dollars, nor more than fifty dollars, which fines shall be recoverable before any alderman or police magistrate in said cities, by summary proceedings, and shall be sued for in the name of such cities, and when collected shall be paid into the treasury thereof.

All fines and penalties imposed by this act shall be recoverable by summary proceedings, before any police magistrate or justice of the peace in said cities; and all suits or actions at law instituted for the recovery thereof shall be in the name and for the use of the city within or against which offense is committed; and upon recovery thereof, all such fines and penalties shall be paid to the city treasurer thereof. In default of the payment of any fine or penalty imposed by any police magistrate or justice of the peace, under the provisions of this act, the person or persons so offending may be committed to the jail, workhouse, or other penal institution of the county in which said city is situated, for a period not exceeding thirty days.

Section 71. The Department or Board or Bureau of Health shall have power to make such rules, regulations, and changes in the foregoing specifications relative to the construction of the plumbing or house drainage as said department, board, or bureau may, from time to

time, determine to be necessary or advisable for the better protection of the safety or health of the occupants of any house, or the community.

Section 72. All acts or parts of acts inconsistent with the provisions of this act or supplied thereby are hereby repealed.

Approved—The 7th day of June, A. D. 1911.

JOHN K. TENER.

The foregoing is a true and correct copy of the Act of the General Assembly No. 272.

ROBERT MCAFEE
Secretary of the Commonwealth.

No. 146

A SUPPLEMENT

To an act approved the seventh day of June, one thousand nine hundred eleven, entitled "An act providing for the examination, licensure, and registration of persons, firms or corporations engaged or engaging in the business or work of plumbing or house drainage, and prescribing certain rules, regulations, and requirements for the construction of plumbing, house drainage, and cesspools in cities of the first class, and imposing fines, penalties, and forfeitures for violation thereof."

Section 1. Be it enacted, &c., That any person who, at the time of the approval of the act to which this is a supplement, was entitled to registration and license as a master or employing plumber, under the provisions of section one of said act, but who failed to register within the time allowed in said act, may, within thirty days after the approval of this act, make application for registration as a master or employing plumber, and be registered and receive a license, in the same manner and with the same effect as if such application had been made prior to the first day of January, one thousand nine hundred and twelve. No such person shall be registered and receive a license until he shall have paid all fees which he would have paid had he been registered and licensed on an application made before said first day of January, one thousand nine hundred and twelve, and annually thereafter, as provided in said act.

Approved—The 5th day of May, A. D. 1915.

MARTIN G. BRUMBAUGH

The foregoing is a true and correct copy of the Act of the General Assembly No. 146.

CYRUS E. WOODS
Secretary of the Commonwealth.

FIRE ESCAPES AND OPENINGS TO FIRE ESCAPES

ACT OF ASSEMBLY

Relating to Fire Escapes

Approved June 3, 1885

It shall be the duty of the owner or owners in fee or for life, of every building constructed more than two stories high and used or intended to be used as a hotel, factory, manufactory, workship, tenement house, school, seminary, college, academy, hospital, asylum, hall or

place of amusement; and of the trustee or trustees of every estate, association, society, college, academy, hospital, or asylum, owning or using any building constructed more than two stories high and used or intended to be used for any of said purposes; and of the Board of Education or Board of School Directors, having charge of any building constructed more than two stories high and used or intended to be used as a public school, to provide and cause to be securely affixed to a bolt through the wall over the window head inside of at least one window in each room on the third floor, and in each room on each higher floor of every such building, a chain at least ten feet in length, with a rope at least one inch in diameter securely attached thereto, of sufficient length to extend to the ground, or such other appliance as may be approved by the Board of Fire Commissioners, of any city or county having a Board of Fire Commissioners, or by the County Commissioners of any county where there is no Board of Fire Commissioners: Provided, however, That when the third floor or any higher floor of any such building is not sub-divided into rooms, then at least six windows on each of such floors shall be provided with such chains and ropes, or such other appliances as may be approved by any Board of Fire Commissioners or by the County Commissioners of any county where no Board of Commissioners shall exist. And provided further, That whenever any room on the third floor or on any higher floor of any such building shall contain more than three windows, then at least one window out of every three windows in every such room shall be provided with such chain and rope, or such other appliance as may be approved by any Board of Fire Commissioners or by the County Commissioners of any county having no Board of Fire Commissioners; and each of such ropes shall be coiled and kept in an unlocked box, in an unobstructed place near the inside sill of the window to which such rope is attached. And in all hotels, factories, manufactories, workshops, schools, seminaries, colleges, hospitals, asylums, halls, or places of amusement, or other places mentioned in this act, the hallways and stairways shall be properly lighted at night; and at the head and foot of each flight of stairs, and at the intersection of all hallways with main corridors, shall be kept during the night a red light; and one or more proper alarms or gongs, capable of being heard throughout the building, shall always remain easy of access and ready for use in each of said buildings, to give notice to the inmates in case of fire; and every keeper of such hotel, factory, manufactory, workshop, school, seminary, college, hospital, asylum, hall, or place of amusement shall keep posted in a conspicuous place in every sleeping room a notice descriptive of such means of escape. And the Board of Fire Commissioners and the County Commissioners of any county having no Board of Fire Commissioners shall have the right to designate the location of the chains and ropes or such other appliances in conformity with this act to be attached to any building under the provisions of this act, and shall grant certificates of approval to every person, firm, corporation, trustee, Board of Education, and Board of School Directors complying with the requirements of this act; which certificate shall relieve the party or parties to whom the same shall be issued, from the liabilities of fines, damages and imprisonment imposed by this act.

Section 2. That every person, corporation, trustee, Board of Education and Board of School Directors neglecting or refusing to comply with the requirements of the first section of this act, shall be liable to a fine not exceeding three hundred dollars, to be collected as fines are now by law collectible, and shall also be deemed guilty of a misdemeanor, punishable by imprisonment for not less than one month nor more than twelve months; and in case of fire occurring in any such building not provided with the chains and ropes or such other appliances as may be required by any Board of Fire Commissioners, or by the

County Commissioners of any county where no Board of Fire Commissioners shall exist, in accordance with the requirements with the first section of this act, the person, persons, trustee, trustees, corporation, Board of Education, or Board of School Directors, who or which neglected or refused to provide such building with the chains and ropes or such other appliances as aforesaid, shall be liable in an action for damages in case of death or personal injury being caused in consequence of such fire breaking out in said building; and such action may be maintained by any person or persons now authorized by law to sue in other cases for injuries caused by neglect of duty.

EXTRACTS FROM ACT MAY 9, 1889

And the Board of Fire Commissioners and the County Commissioners of any county having no Board of Fire Commissioners may direct that the foregoing requirements in so far as they relate to the placing and keeping of chains and ropes in hospitals and asylums, may be dispensed with whenever, in their judgment, the same would be unnecessary.

FORMULA GOVERNING THE ERECTION OF FIRE ESCAPES

In accordance with the Act of Assembly approved July 12, 1897, and the Ordinance of Councils approved December 10, 1896, and supplemental thereto, the following formula will govern the matter of the design, construction and erection of all fire escapes hereafter required within the City of Philadelphia.

PLATFORMS

The platforms shall consist of iron or steel balconies not less than four (4) feet in width, the length of the platform to be dependent upon the size of the building and the number of its occupants. The Inspector of the District will designate the length of such platform, which shall extend in front of, and not less than nine (9) inches beyond at least two windows, except in the case of a doorway leading from the floor level of the building to the floor level of the platform, in which case such doorway opening will suffice. Each platform shall be provided with a landing at the head and foot of each stairway of not less than twenty-four (24) inches. The floors of balconies must be of wrought iron or steel, one and one-half (1½) inches by five-sixteenths (5/16) inch slats, or channel irons not less than one-quarter (¼) inch thick in their least section, not more than one and one-quarter (1¼) inches apart, and be securely riveted to frame and brackets.

Outside angle frame to be not less than two and one-fourth (2¼) inch angle iron. Where slats of platform run at right angles to wall, wall angle shall be riveted to clips made of angle iron four (4) inches in length let into wall three (3) inches. All stair openings to be sufficient to provide clear headway, but that of the top platform to be no longer than sufficient to provide clear headway.

In all cases platforms must be designed, constructed and erected to safely sustain in all their parts a safe load, at a ratio of four to one, of not less than eighty (80) pounds per square foot of surface.

RAILINGS

The outside top railing to extend around the entire length of the platform, and through the wall at each end, and to be properly secured by nuts and washers, or otherwise equally well braced and bolted. The

top rail of the balcony must not be less than one (1) inch, inside diameter, pipe iron, or material equally as strong. The bottom rail must not be less than one (1) inch, inside diameter, pipe iron or material equally as strong, well leaded into the wall. The standards must be not less than one (1) inch, inside diameter, pipe iron, or material equally as strong, spaced not more than three (3) feet apart and securely braced by means of outside braces, which are to be securely fastened to the brackets of platforms, which brackets shall extend at least six (6) inches beyond railing, and must be securely connected with top and bottom rail and platform frame.

Standards must also be securely braced by means of outside brackets. Railings in all cases to extend around the stairway openings and be continuous down the stairway. The height of the railings to be not less than three (3) feet.

STAIRWAYS

Stairways must be designed, constructed and erected to safely sustain in all their parts a safe load, at a ratio of four to one, of not less than one hundred (100) pounds per step, with the exception of the tread, which must safely sustain, at a ratio of four to one, a load of two hundred (200) pounds per tread. The treads to be not less than eight (8) inches wide, and the rise not more than eight (8) inches. The stairs in all cases to be not less than twenty-four (24) inches wide, and the strings or horses to be not less than three (3) inch channels of iron or steel, or other shape equally as strong: Provided, They fall within the allowable stress as prescribed by the Act approved June 5, 1901, and to rest upon and be fastened to a bracket; said bracket to be fastened through the wall as otherwise provided for brackets. The strings or horses to be also securely fastened to the balcony at the top. The steps in all cases to be double riveted or bolted to the strings or horses.

BRACKETS

Brackets must be not less than two and one-fourth (2¼) inch angle iron or steel, or material equally as strong, not more than three (3) feet apart, braced by means of not less than one (1) inch square, or one and one-quarter (1¼) inch round iron, let into the wall at least four (4) inches, with shoulder on brace, and three inches, x three inches iron washers between shoulder and wall, and to extend down the wall four (4) feet from the top of the bracket, and out on the bracket-angle three (3) feet from the wall. In all cases the bracket angle directly under the balcony must be secured to the wall by means of bolts of suitable size passing through the wall, and four (4) inch washers. There must be also a two and one-quarter (2¼) inch angle iron between brackets riveted to the balcony angles for the slats to rest upon. Whenever the bottom balcony is supported by means of suspension rods (riveted or bolted) to the balcony above, the brackets (of the above balcony) shall be increased in size to meet the increased strain occasioned thereby. The bottom balcony to have a drop ladder of same construction as the stairway, to be hinged and hung with back arm balance weight: Provided, That when the above manner of balancing ladder is impracticable, the Board may allow ladder to be counter-balanced with weight and chain, said weight, when practicable, to be hung within the platform railing, and rest upon platform, or there shall be provided a metal basket or bracket support sufficient to properly sustain or carry the counter-balance weight. The form of this device to be subject to the approval of the Inspector: Provided further, That the use of cables is hereby prohibited.

Wire screens to be provided, when in the judgment of the Board, they are deemed necessary. In all cases bolts, rivets, and other material used shall be proportioned so as to develop the full strength of the members connected by them. All parts of such fire escapes must receive not less than two coats of paint—one coat in the shop and one after erection.

EDWIN CLARK
President Bureau of Fire Escapes

(Approved. Philadelphia, December 20, 1906.)

ACT OF ASSEMBLY

Relating to Fire Escapes

Approved July 12, 1897

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same: That all the following described buildings within this Commonwealth, to wit: Every building used as a seminary, college, academy, hospital, asylum, or hotel, for the accommodation of the public, every storehouse, factory, manufactory or workshop of any kind, in which employes or operatives are usually employed at work in the third or any higher story, every tenement house, or other building in which rooms or floors are usually let to lodgers or families, every public hall or place of amusement, every parochial or public school building and every building used in whole or in part for offices when any of such buildings are three or more stories in height, except buildings used in whole or in part for offices which are of fire-proof constructions, shall be provided with a permanent, safe, external means of escape therefrom, in case of fire, independent of all internal stairways; the number and location of such escapes to be governed by the size of the building, and the number of inmates; and arranged in such a way as to make them readily accessible, safe and adequate, for the escape of said inmates. Such escapes to consist of outside, open, iron stairway, of not more than forty-five degrees slant, with steps not less than six inches in width and twenty-four inches in length. And all of said buildings capable of accommodating from one hundred to five hundred or more persons, as operatives, guests, or inmates, shall be provided with two such stairways, and more than two stairways if such be necessary to secure the speedy and safe escape of said inmates in case the internal stairways are cut off by fire or smoke. And it shall be the duty of the owner or owners in fee, for life, of every such building and of the trustee or trustees of every estate, association, society, college, seminary, academy, hospitals, or asylum, owning or using any such building, and of the Board of Education or Board of School Directors, having charge of any such school building, to provide, and cause to be securely affixed, outside of every such building, such permanent, external, uninclosed fire escape: Provided, That nothing herein contained shall prohibit any person whose duty it is under this act to erect fire escapes, from selecting and erecting any other and different device, design, or instrument, being a permanent, safe, external means of escape, subject to the inspection and approval of the constituted authorities for that purpose.

Section 2. It shall be the duty of the Board of Fire Commissioners, in conjunction with the Fire Marshal of the district where such Commissioners and Fire Marshal are elected or appointed, to first examine and test such fire escape or escapes and after, upon trial, said fire escape or escapes should prove to be in accordance with the requirements of

Section 1 of this act, then the said Fire Marshal, in connection with the Fire Commissioners, or a majority of them, shall grant a certificate approving said fire escape, thereby relieving the party or parties to whom such certificate is issued from the liabilities of fines, damages and imprisonment imposed by this act: Provided, further, That in counties where no such Fire Marshal or Fire Commissioners exist, then the County Commissioners in each said county shall be the Board of Examiners, and shall grant certificates of approval when escapes are erected in accordance with the requirements of Section 1 of this act.

Section 3. That every person, corporation, trustee, Board of Education, and Board of School Directors, neglecting or refusing to comply with the requirements of Section 1 of this act, in erecting said fire escape or escapes, shall be liable to a fine not exceeding three hundred dollars; and also be deemed guilty of a misdemeanor; punishable by imprisonment for not less than one month or more than two months. And, in case of fire occurring in any of said buildings in the absence of such fire escape or escapes, approved by certificate of said officials, the said persons or corporations shall be liable in an action for damages in case of death or personal injuries sustained in consequence of such fire breaking out in said building; and shall also be deemed guilty of a misdemeanor, punishable by imprisonment for not less than six months nor more than twelve months; and such action for damages may be maintained by any persons now authorized by law to sue as in any other cases of similar injuries: Provided, That nothing in this act shall interfere with fire escapes now in use approved by the proper authorities.

AN ACT

Regulating the openings of buildings upon, over, or under external fire escapes.

Section 1. Be it enacted, etc., That all exits to external fire escapes shall be by means of doors of fire-proof construction, in which doors there may be placed wire glass, if glass is required for lighting the interior; and all windows, hereafter opening upon, over or under external fire escapes, shall be of fire-proof construction, with wire glass therein, and with metal fire-proof frames around the windows.

Section 2. Every person, firm, or corporation, trustee, board of education and board of school directors, or any person or persons having charge, either as agents, trustees, or as a commission, having charge of any building, neglecting or refusing to comply with Section 1 of this Act, shall be deemed guilty of a misdemeanor, punishable by a fine of not more than three hundred dollars, or an imprisonment for not more than two months, or either or both, within the discretion of the Court: Provided, That nothing in this Act shall interfere with fire escapes, now in use, approved by the proper authorities.

Approved the twentieth day of May, A. D., 1913.

JOHN K. TENER

RELATING TO MOTION PICTURE THEATRES

No. 312

AN ACT

To regulate the construction, maintenance, and inspection of buildings used for the exhibition of moving-pictures, in all cities of the first class; providing for the enforcement thereof, and fixing penalties for violation of the same.

Section 1. Be it enacted, &c., That no building in any city of the first class, which at the time of the passage of this act is not in actual use for the exhibition of moving pictures, and no building hereafter erected in said cities, not in conformity with the requirements of this act, shall be used for the purpose of exhibiting moving pictures until such buildings shall have been made to conform to such requirements; and no building not in such actual use, shall be open to the public for the exhibition of moving pictures until the Chief of the Bureau of Building Inspection, the Chief of the Bureau of Fire, and the Fire Marshal, shall, in writing, approve such building for the purpose of exhibiting moving pictures, and shall certify the same conforms to the requirements of this act. No licenses shall be issued, under the provisions of any law or ordinance, licensing for the exhibition of moving pictures any building, not in actual use for that purpose at the time of the passage of this act, unless upon such written approval and certificate; and no exhibition of moving pictures shall be permitted in any such building until such written approval and certificate shall have been given.

Section 2. Any building hereafter erected or altered to be used for the exhibition of moving pictures, and with a seating capacity of five hundred or less, shall be enclosed with brick walls, the rear wall to abut on a street or alley, or other open space, with proper exit therefrom. Buildings located upon the corner of two streets, may, in lieu of one of the rear exits therein provided for, have an exit upon the side street; providing said street is at least ten feet in width. The auditorium in every such building shall be located in the first story only. Every such building shall have in the street front at least two five-foot exits, where the seating capacity is two hundred and fifty or less, with two additional rear exits, not less than five feet in width; and where the seating capacity is more than two hundred and fifty and not more than five hundred, there shall be provided in the front at least three five-foot exits, with two additional exits in the rear, each of which shall be six feet in width. Such rear exits shall lead directly to a street or alley not less than ten feet in width. The Chief of the Bureau of Building Inspection may require additional exits in any case, if, in his judgment, they may be deemed necessary or proper for the safety of the public.

Section 3. The first floor of such buildings shall be constructed of iron or steel beams, filled in with concrete, terra-cotta, brick, or other fireproof material, the said iron or steel to be thoroughly fireproofed and the basement columns to be of fireproof construction. The ceilings shall be covered with wire-lath and plastered with cement-mortar. No such building hereafter erected or altered, as aforesaid, to be used for moving picture exhibitions, with a seating capacity of five hundred or less, and no portion of any such building, shall be occupied or used as a dwelling or tenement house, apartment house, hotel or department store. Such restriction shall relate and be applicable, not only to the portion containing the auditorium, but also to the entire structure or building used for moving picture exhibitions, or in connection therewith.

Section 4. Every building hereafter erected or altered to be used for the exhibition of moving pictures, with a seating capacity of over five hundred, shall be a fireproof building. The roof of such building shall be constructed of fireproof material. Every such building shall not be over one story in height, nor have a balcony between the first floor and the roof. In the street front of every such building there shall be suitable means of exit for the public. There shall be provided on each side of every such building an open court, at least five feet in width, where the seating capacity is over five hundred and less than one thousand; and seven feet in width, where the seating capacity is over one thousand. Such courts shall begin on a line with the

proscenium wall, and continue to the street upon which the building fronts. If the building is situated upon the corner of two streets, the side street shall be considered in lieu of one of the courts. There shall be provided, for emergency, two five-feet exits on each side of the auditorium, leading directly into the open courts as mentioned above. Where the seating capacity is over five hundred, there shall be provided in the front, facing upon the street, three five-feet exits, which shall be increased in width in the ratio of twenty inches for every one hundred persons, or fraction thereof, that the seating capacity exceeds five hundred. There shall be provided a brick wall separating the auditorium from the platform; said wall to continue to a height of at least four feet above the highest point of the roof. No such building, hereafter erected or altered as mentioned in this section, to be used for the exhibition of moving pictures, with a seating capacity of over five hundred, and no portion of any such building, shall be used for any other purpose. The term fireproof building, as mentioned in this section, shall mean one in which the enclosing walls are of brick, stone or concrete, and the floors constructed of concrete, brick, or terra-cotta, supported upon concrete or steel girders, beams and columns; the said girders, beams and columns to be fireproofed with approved fireproof material, of at least three inches for columns and girders and two inches for beams.

Section 5. In every building hereafter erected or altered to be used for the exhibition of moving pictures, all aisles shall be at least three feet wide at the beginning, and shall increase in width toward the exits in the ratio of one and one-half inches to five running feet. Aisles, having seats on one side only, shall be not less than two feet wide at the beginning, and shall increase in width in the above mentioned ratio. All seats shall be firmly secured to the floor, and shall be so placed that there shall not be more than six chairs between any one seat and an isle. There shall be provided, in the rear of the seats abutting upon street, a lobby of sufficient size to provide at least one and one-half square feet of lobby room, exclusive of the aisle space between seats, for every person who may be seated in the building.

Section 6. In every building hereafter erected or altered to be used for the exhibition of moving pictures, regardless of size or seating capacity, the platform shall be constructed of fireproof material, except that portion equal to the width of the proscenium opening and the depth of the platform. All partitions shall be constructed of fireproof material, firmly secured to the floor and ceiling; and all decorations must be fireproofed and firmly fixed in position. The flies or decorative fixtures upon the platform must be fireproofed and firmly fixed to the said platform. The booth for the moving picture machine shall be constructed of fireproof material, with a ventilator extending through the front of the partition. In the floor construction, a wooden top floor may be used if attached to sleepers embedded in cinder concrete. The curtain shall be an approved asbestos curtain. No dressing rooms shall be allowed in such buildings. The cellar shall not be used for manufacturing purposes, or for the storage of materials. All electrical installation throughout the building shall be approved by the Chief of the Electrical Bureau of said cities. There shall be provided emergency lights, on separate circuit from the general house lights, which emergency lights shall be kept lighted during all performances. The lighting throughout the building shall be by means of electricity, and the heating by means of steam or hot water. And every such building shall have at least one front abutting upon the street, which front shall be not less than twenty-five feet in width, and shall be as wide as the widest part of the auditorium. Gradients shall be used, instead of steps, wherever possible: Provided, That nothing in this act shall be construed to apply

to theatres now in existence or hereafter constructed, or to buildings, in which moving-picture exhibitions are being given at the time of the passage of this act. None of the provisions of this act shall apply to any church, or other place, not devoted to the business of such exhibitions, so as to prohibit the giving of a single or occasional exhibition of moving pictures therein, if a permit for each such exhibition shall first be obtained from the Fire Marshal of such city.

Section 7. None of the provisions of this act shall be construed as repealing or superseding any ordinance or ordinances, now in existence in such cities of the first class, providing for the issuing of licenses for places in which moving picture exhibitions are held, or for the operation of such exhibitions, or for regulating the operation of moving picture machines.

Section 8. Any person or persons who shall exhibit moving pictures in any city of the first class, in any building not conforming to the requirements of this act, or who shall otherwise violate any of the provisions hereof, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of five hundred (500) dollars, or by imprisonment for not more than three (3) months, or both, in the discretion of the court.

Section 9. All acts, or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—The 9th day of June, A. D. 1911.

JOHN K. TENER.

The foregoing is a true and correct copy of the Act of the General Assembly No. 312.

ROBERT MCAFEE
Secretary of the Commonwealth.

No. 121

AN ACT

To amend section six of an act, approved the ninth day of June, one thousand nine hundred and eleven (Pamphlet Laws, seven hundred forty-six), entitled "An act to regulate the construction, maintenance, and inspection of buildings used for the exhibition of moving pictures, in all cities of the first class; providing for the enforcement thereof, and fixing penalties for the violation of the same," by providing for the heating by means of mechanical warm air.

Section 1. Be it enacted, &c., That section six of an act, approved the ninth day of June, one thousand nine hundred and eleven (Pamphlet Laws, seven hundred forty-six), entitled "An act to regulate the construction, maintenance, and inspection of buildings used for the exhibition of moving pictures, in all cities of the first class; providing for the enforcement thereof, and fixing penalties for violation of the same," is hereby amended to read as follows:

Section 6. In every building hereafter erected or altered to be used for the exhibition of moving pictures, regardless of size or seating capacity, the platform shall be constructed of fireproof material, except that portion equal to the width of the proscenium opening and the depth of the platform. All partitions shall be constructed of fireproof material, firmly secured to the floor and ceiling; and all decorations must be fireproofed and firmly fixed in position. The flies or decorative fixtures upon the platform must be fireproofed and firmly fixed to the said platform. The booth for the moving picture machine shall be constructed of fireproof material, with a ventilator extending through the front of the partition. In the floor

construction, a wooden top floor may be used if attached to sleepers imbedded in cinder-concrete. The curtain shall be an approved asbestos curtain. No dressing rooms shall be allowed in such buildings. The cellar shall not be used for the storage of materials. All electrical installation throughout the building shall be approved by the Chief of the Electrical Bureau of said cities. There shall be provided emergency lights, on separate circuit from the general house lights, which emergency lights shall be kept lighted during all performances. The lighting throughout the building shall be by means of electricity, and the heating by means of steam, [or] hot water, *or mechanical warm air.* And every such building shall have at least one front abutting upon the street, which front shall be not less than twenty-five feet in width, and shall be as wide as the widest part of the auditorium. Gradients shall be used, instead if steps, wherever possible: Provided, That nothing in this act shall be construed to apply to theatres now in existence or hereafter constructed, or to buildings, in which moving picture exhibitions are being given at the time of the passage of this act. None of the provisions of this act shall apply to any church, or other place, not devoted to the business of such exhibitions, so as to prohibit the giving of a single or occasional exhibition of moving pictures therein, if a permit for such exhibition shall first be obtained from the Fire Marshal of such city.

Approved—The 7th day of April, A. D. 1925.

GIFFORD PINCHOT.

The foregoing is a true and correct copy of the Act of the General Assembly No. 121.

CLYDE L. KING
Secretary of the Commonwealth.

ALLOWABLE FLOOR AREAS WITH AND WITHOUT SPRINKLER SYSTEMS

No. 138

AN ACT

Relating to the building construction in cities of the first class, by prescribing the maximum undivided floor areas permitted, and permitting the use of non-fireproof steel roof trusses and purlins in certain cases; prescribing limitations on garages, automobile service stations and buildings for similar purposes, and constructions permitted for curtain and spandrel walls; permitting the use of wood furring and stud partitions in certain cases; and repealing inconsistent laws.

Section 1. Be it enacted, &c., That no building hereafter erected or altered in cities of the first class shall have an undivided floor area greater than hereafter indicated:

ONE STREET FRONTAGE—With Sprinkler System.
First class—Unlimited.
Second class—Twenty thousand square feet.
Third class—Ten thousand square feet.

Without Sprinkler System
First class—Twenty-five thousand square feet.
Second class—Ten thousand square feet.
Third class—Five thousand square feet.

TWO STREET FRONTAGE—With Sprinkler System.
First class—Unlimited.
Second class—Twenty-five thousand square feet.
Third class—Fifteen thousand square feet.

Without Sprinkler System

First class—Twenty-five thousand square feet.
Second class—Fifteen thousand square feet.
Third class—Seven thousand five hundred square feet.

THREE STREET FRONTAGE—With Sprinkler System.
First class—Unlimited.
Second class—Thirty thousand square feet.
Third class—Fifteen thousand square feet.

Without Sprinkler System

First class—Unlimited.
Second class—Fifteen thousand square feet.
Third class—Ten thousand square feet.

Provided, however, That buildings of the third class, in which the floors and roofs are made of planks not less than one and three-fourths of an inch thick when dressed, may have a maximum undivided floor area of seven thousand five hundred square feet: And further provided, That one story buildings of the second class equipped with sprinkler system may have an undivided floor area of not in excess of fifty thousand square feet.

Section 2. Sprinkler systems as mentioned in this act, except as may be otherwise prescribed by the Bureau of Building Inspection, must be systems of automatic sprinklers which conform to the standard regulations of the Philadelphia Fire Underwriters' Associations and Associated Factory Mutual Fire Insurance Companies. If such system shall not be maintained and kept in complete working order, it shall be the duty of the Bureau of Building Inspection to give written notice to the tenants or owners, served upon the premises, of said fact, and, within sixty (60) days thereafter, the floor area shall be divided by fireproof walls or partitions so that no undivided floor area shall exceed the area prescribed for a building of the same class and with the same street frontage which is not equipped with a sprinkler system.

Section 3. In determining for buildings used for manufacturing or similar purposes, and which stand in large factory sites, the undivided floor area permissible under section one of this act, a paved driveway not less than twenty-five feet wide may be considered as a street: Provided, however, That the site have adequate water supply and fire hydrants, and that the buildings be properly separated, with ready access to all sections of the manufacturing plant.

Section 4. Fireproofing of steel roof trusses and steel purlins shall not be required in buildings, of first class construction nor in buildings of second class construction equipped with sprinkler system: Provided, That the trusses and purlins support only the roof, and that the distance from the floor to the under side of the trusses is not less than fourteen feet.

Section 5. No building used as a garage or automobile service station or for any similar purpose, which is not of first class fireproof construction, shall be erected to a greater height than two stories nor have an undivided floor area exceeding five thousand square feet: Provided, That one story buildings of second class construction, used for purposes set forth in this section, may have an undivided floor area of ten thousand square feet.

Section 6. Curtain walls in steel or concrete skeleton construction in buildings of the first class shall have walls of fire resistive construction of adequate strength, subject to the approval of the Bureau of Building Inspec-

tion, and no such curtain walls or masonry construction shall have a less thickness than nine inches.

Section 7. Spandrel walls of masonry under window openings in any building shall have a thickness of not less than nine inches, and shall be of adequate strength, subject to the approval of the Bureau of Building Inspection.

Section 8. In all buildings of the second or third class hereafter erected or altered, the use of wood furring and stud partitions supporting wire lath and plaster is permitted. Such furring and partitions shall have incombustible fire stops at each story, subject to the approval of the Bureau of Building Inspection: Provided, That such partitions shall not be supporting partitions.

Section 9. All acts or parts of acts inconsistent herewith be, and the same hereby are, repealed.

Approved—The 10th day of May, A. D. 1923.

GIFFORD PINCHOT.

The foregoing is a true and correct copy of the Act of the General Assembly No. 138.

CLYDE L. KING
Secretary of the Commonwealth

ACT OF ASSEMBLY

No. 496

May 7, 1855

Relating to walls encroaching over party lines, provides:

Section 8. That any lot of the width of sixteen feet or less shall not be incumbered with more than nine inches of the stone wall, or more than four and a half inches of the brick wall, nor in any case shall any party wall be placed on the adjoining lot more than ten inches for the stone wall, or more than six and a half inches for the brick wall.

FIRE PROTECTION

No. 211

AN ACT

To provide for the better security of buildings from fire in the City of Philadelphia.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met and it is hereby enacted by authority of the same, That in addition to the duty now required by law, it shall be the duty of the inspectors of buildings, in the City of Philadelphia, to examine the flues of every building, or buildings, in the course of erection or alteration within the limits of said city, and shall require the contractors or builders to so construct the flues thereof that they will not communicate with the adjacent woodwork; nor shall any flue be built in any party or division wall unless the same is more than nine inches thick.

Section 2. It shall be the duty of contractor, contractors or builders, erecting or altering buildings, to notify said inspectors, whose duty it is hereby made, within forty-eight hours thereafter, to examine and approve or condemn said flues.

Section 3. Any contractor, contractors or builders refusing or neglecting to comply with this act, shall, upon conviction thereof, be fined in the sum of not less than five hundred dollars or more than one

thousand dollars: Provided, That the provisions of this bill shall not apply to the rural districts of the twenty-third ward of the City of Philadelphia.

Section 4. Nor shall any person place any girder, joist or beam, rafter or trimmer, within two inches of the outside of any flue; and that all laws inconsistent with this are hereby repealed.

BUTLER B. STRANG
Speaker of the House of Representatives

CHESTER H. STINSON
Speaker of the Senate.

Approved the twenty-third day of February, A. D., one thousand eight hundred and seventy.

JOHN W. GEARY

BUILDINGS—SIZE AND LOCATION OF

No. 175

AN ACT

To authorize the regulation of the location, size, and use of buildings in cities of the first class.

Section 1. Be it enacted, &c., That, for the purpose of promoting the public health, safety, order, and general welfare, cities of the first class may regulate the location, size and use of buildings therein, and may make different regulations for different districts thereof. The park commission of any city of the first class may make such regulations as to the location, size, and use of buildings, any portion of which shall come within two hundred feet of any park, parkway, playground, or other public place under its care or management, and, upon their approval by the councils of such city, said regulations shall have the same effect as if originally made by said councils.

Approved—The 11th day of May, A. D. 1915.

MARTIN G. BRUMBAUGH.

The foregoing is a true and correct copy of the Act of the General Assembly No. 175.

CYRUS E. WOODS
Secretary of the Commonwealth

WATER SUPPLY FIXTURES

No. 271

AN ACT

Prescribing the number of fixtures for water supply for houses and other buildings occupied as dwellings in cities of the first class, making violation of its provisions a misdemeanor, and providing punishment for the same.

Section 1. Be it enacted, &c., That for every house or other building in cities of the first class, occupied or hereafter to be occupied for dwelling purposes, there shall be located conveniently on the premises occupied by such house or other building, or appurtenant thereto, at

least one fixture or source of water supply, for the exclusive use of each such house or other building, which fixture, or source of water supply, shall be kept and maintained in such condition as to supply water thereto freely at all times: Provided, That where in any case, such dwelling houses are located on a court or common front yard, and have no rear or side yard, one fixture or source of water supply may be established for each three such houses, provided the same is located in immediate proximity to such houses and is freely accessible from each of them.

Section 2. Any person, firm, or corporation letting for use or occupation, or causing or permitting to be used or occupied or let for use or occupation, for dwelling purposes, any house or other building in violation of the provisions of this act, or neglecting to maintain such fixture or source of water supply in accordance with the provisions of this act, shall be guilty of a misdemeanor; and upon conviction thereof shall be subject to a penalty of ten dollars for each month, or portion thereof, for which each such house or other building shall be occupied for such purposes in violation of this act, or during which the maintenance of such fixture or source of water supply in the condition provided in the first section of this act shall be neglected or omitted.

Section 3. It shall be the duty of the Department of Public Health and Charities to enforce the provisions of this act, and to institute and prosecute all proceedings for violation thereof.

Section 4. This act shall take effect after the expiration of one year from the date of enactment thereof.

Section 5. All acts or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—The 7th day of June, A. D. 1911.

JOHN K. TENER.

The foregoing is a true and correct copy of the Act of the General Assembly No. 271.

ROBERT MCAFEE
Secretary of the Commonwealth

LIVE LOADS IN BUILDINGS

No. 93

AN ACT

Relating to building construction in cities of the first class, by prescribing the minimum live loads to be considered in designing the walls, floors, roofs, yards, and courts of all buildings hereafter erected or altered in cities of the first class, specifying the factors of safety to be applied in such designs; regulating the thickness of brick walls in dwellings; prescribing the minimum thickness of wooden floor joists and roof rafters; defining the various classes of buildings and other terms used in the act; regulating the loading of floors; providing penalties for violations; and repealing inconsistent laws.

Section 1. Be it enacted, &c. That every building hereafter erected or altered in cities of the first class shall have the floors, roof, yard, or court so designed as to provide sufficient strength in all parts to bear safely any imposed loads, whether permanent or temporary, in addition to the dead loads depending thereon: Provided, however, That no floor in any building, or in any extension to an existing building, hereafter erected or altered, shall be designed to carry less than the following live loads per square foot of area, uniformly distributed, according as the floor may be intended or used for the purposes indicated:

(a) Forty pounds for residence buildings.

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(b) One hundred pounds for public buildings or places of assembly, except that for classrooms of schools or other places of instruction the floor need not be designed for more than seventy-five pounds.

(c) One hundred and twenty pounds for business buildings, except that the floors of offices need not be designed for more than sixty pounds.

Section 2. The live loads for which any and every floor may be designed shall be clearly shown in the application and on the plans before any permit to erect is issued.

Section 3. Concentrated loads. Every steel floor beam in any building, hereafter erected or altered, used for any business purpose, shall be capable of sustaining a live load concentrated at its center of at least four thousand pounds.

Section 4. Moving loads. Running machinery or other moving loads shall be considered as increasing the live loads in proportion to the degree of vibratory impulse transmitted to the floor.

Section 5. Roof loads. Every roof hereafter erected shall be proportioned to bear safely a live load of thirty pounds per square foot of surface.

Section 6. Yard and court loads. For yards and courts inside the building line, the live loads shall be taken at not less than one hundred and twenty pounds per square foot.

Section 7. The factor of safety shall be as one to four for steel, wrought iron, and timber, and concrete; and as one to six for cast iron; and as one to ten for natural or artificial stone and brick or stone masonry. All calculations shall be based upon the actual sizes of the materials and not the nominal sizes.

Section 8. The minimum thickness of any wooden floor, joists, or roof rafters shall be two inches, provided such joists or rafters are not more than twelve inches in depth.

Section 9. Doubtful classification. In case any building is not herein specifically provided for, or if there is any uncertainty as to its classification, its status shall be fixed by a rule promulgated by the chief of the Bureau of Building Inspection.

Section 10. Mixed occupancy. In case a building is occupied or used for different purposes in different parts, the provisions of this act apply to each class of occupancy shall apply to such parts of the building as come within that class, and if there should be conflicting provisions the requirements securing the greater safety shall apply.

Section 11. Loading of floors. No person shall place, or cause or permit to be placed, on any floor of any building any greater load than the approved safe load.

Section 12. Safes. No safe shall be placed on a stair landing or in a stair hall, nor shall its weight be carried by any beam which also carries the floor of any landing or stair hall.

Section 13. All buildings, used exclusively as dwellings for one or two families, not over twenty feet in width and sixty feet in length, having a height not exceeding twenty-six feet, may have brick walls nine inches in thickness: Provided, That if any such walls are party walls, the adjoining lot shall not be encumbered with more than nine inches of stone wall and four and one-half inches of brick wall.

Section 14. Definitions. The various terms appearing in this act are defined as follows:

Dead load. The term "dead load" means the weight of walls, partitions, framing, floors, roofs, and all permanent construction entering into any building.

Live load. The term "live load" means all forms of loading other than the weight of the material entering into the construction of the building.

Residence buildings. "Residence buildings" are buildings or parts of buildings in which sleeping accommodations are provided, except such as may for other reasons be classified as public buildings, including dwellings, tenement houses, hotels, apartment houses, lodging houses, dormitories, convents and studios, hospitals, asylums, and club houses having sleeping accommodations.

Public buildings. "Public buildings" are buildings or parts of buildings in which persons congregate for civic, political, education, religious, or recreational purposes, or in which persons are held or detained by reason of public or civic duty or for correctional purposes, including court houses, passenger depots, schools, colleges, libraries, museums, exhibition buildings, lecture halls, churches, assembly halls, lodge rooms, dance halls, theatres, bath houses, armories, fire houses, police stations, and jails.

Business buildings. "Business buildings" are buildings or parts of buildings which are not public buildings or residence buildings, including office buildings, stores, markets, restaurants, warehouses, freight depots, car barns, stables, garages, factories, laboratories, smoke houses, grain elevators, and coal pockets.

Section 15. (a) Any person, firm, partnership or corporation found guilty of violating any of the provisions of this act shall, for the first offense, be sentenced to pay a fine of not less than fifty dollars ($50.00), and, for the second and each subsequent offense, shall be sentenced to pay a fine of not more than seventy-five dollars ($75.00), to be recovered as debts of like amount are now by law recoverable, and all fines so recovered shall be paid into the city treasury.

(b) City magistrates shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and to impose the penalties prescribed, subject to appeal as the laws shall direct.

(c) It shall be the duty of the chief of the Bureau of Building Inspection to carry out the provisions of this act and to institute prosecutions for violation thereof.

Section 16. All acts or parts of acts inconsistent herewith be, and the same are hereby, repealed.

Approved—The 8th day of May, A. D., 1919.

WM. C. SPROUL.

The foregoing is a true and correct copy of the Act of the General Assembly No. 93.

CYRUS E. WOODS
Secretary of the Commonwealth

STAND PIPES AND SPRINKLER SYSTEMS

No. 405

AN ACT

Authorizing council in cities of the first class, by ordinance, to require the installation of standpipes and sprinkler systems in certain buildings in such cities, to prescribe the kind and character thereof, and regulations therefor; and to provide for the enforcement of such ordinance.

Section 1. Be it enacted, &c., That for better fire protection in cities of the first class of this Commonwealth, the city council is authorized and empowered to provide, by ordinance, for the installation of standpipes in all buildings hereafter erected or altered of eighty-five feet, or six stories or more, in height

Section 2. The council in said cities is authorized and empowered to require the installation of sprinkler systems in the basements of buildings hereafter erected or altered, to be used for stores, factories, or warehouses, in which the city council may determine such sprinkler systems to be necessary.

Section 3. The city council may prescribe the kind and character of such standpipes and sprinkler systems and the details of their installation, and may provide for carrying into effect and enforcing the provisions, of such ordinance.

Approved—The 30th day of June, A. D., 1923.

GIFFORD PINCHOT.

The foregoing is a true and correct copy of the Act of the General Assembly No. 405.

CLYDE L. KING
Secretary of the Commonwealth

IMPROPER GRADING AND DEFECTIVE PAVING

No. 416

AN ACT

Providing for the abatement of nuisances caused by the improper grading or defective paving or encroaching fences in alleys, in cities of the first class; for the establishment of lines and grades for, and the grading, paving or repaving of, said alleys, and the grading of private alleys hereafter laid out; and for apportioning the cost, and for the filing of liens therefor.

Section 1. Be it enacted, &c., That in cities of the first class when the board of health shall declare any private alley to be a nuisance by reason of improper grading or defective paving of said alley, and shall so certify to the Department of Public Works, the said Department of Public Works is hereby empowered to abate said nuisance upon the neglect or refusal of the registered owners of the property abutting on, or having the use, or actually using, such alley to abate said nuisance within ten days after service of notice, by the said Department of Public Works, upon the said registered owners so to do, as hereinafter provided.

Section 2. The said Department of Public Works shall grade, pave, or repave the said alleys in accordance with lines and grades established by the surveyor and regulator of the district in which said alleys are situate, and the said surveyor and regulator is hereby empowered to establish such lines and grades.

Section 3. Any fence encroaching upon a public or private alley is hereby declared a nuisance and made unlawful; and the said Department of Public Works is empowered to remove such fence from within the established lines of said alleys, after ten days' notice as set forth in this act. It shall be the duty of the registered owner of the premises on which such fence is erected, or to which it appertains, to remove such encroachment upon being notified. His failure so to do shall constitute a violation of this act.

Section 4. No alley having an outlet to any public street, public highway, public alley, or to a private alley which has an outlet to any public street, highway, or alley, shall hereafter be laid out or opened

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unless it shall be in accordance with lines and grades established by the surveyor and regulator for the district in which said alley will be situate.

Section 5. The said Department of Public Works is hereby empowered to charge the cost and expense of the grading, paving, or repaving of said alleys, or part or parts of said alleys, upon the said owners in proportion to the width of their properties abutting thereon, or having the use thereof by deed or otherwise, or actually using the alley, or in any other proportions as may, under the facts and circumstances of the case, be deemed just and proper by the said Department of Public Works and also to charge the cost of the removal of any encroaching fence to the owner of the said fence. Upon the failure to pay any of the said charges, the department shall cause liens to be filed therefor, in the name of the city, in the manner and according to the practice prescribed by law with respect to municipal claims.

Section 6. Notices requiring compliance with this act shall be served upon the registered owner, or his agent, or by posting a copy upon the premises, which notice shall not be removed or defaced while the condition exists. All notices shall be complied with within ten days, and upon failure to comply, said department may contract to have the necessary work done, and the cost thereof shall be made a lien against the property and collectible as now provided by law: Provided, however, That if there shall be no funds at the disposal of the said department for the aforesaid purpose, then the said department may contract to have such work done, and the lien therefor shall be marked to the use of the contractor doing the work and shall be collectible by the said contractor as is now provided by law in similar cases. Said contractor shall have the right to use all the legal processes that cities of the first class now have for the collections of liens, but in no case shall they have recourse to the city.

Section 7. Any person who shall violate any of the provisions of this act, or who shall interfere with any of the employes of the Department of Public Works while enforcing the provisions of this act, shall, for every such offense, upon conviction thereof in a summary proceeding before any magistrate of the said city and county in which the offense was committed, be subject to a fine of not less than $5.00 or more than $50.00, or by imprisonment for thirty days, either or both, at the discretion of the court. All fines to be paid into the treasury of the city.

Section 8. The act, entitled "An act providing for the abatement of nuisances in private alleys, in cities of the first class; and for the establishment of grades in, and the grading, paving, and repaving of, such private alleys, where necessary to abate such nuisances; and providing for the filing of liens for the cost thereof," approved the twenty-fifth day of June, one thousand nine hundred and thirteen (Pamphlet Laws, five hundred forty-four), is hereby repealed. All other acts inconsistent herewith are hereby repealed: Provided, That this act shall not affect any pending proceedings, but the same may be completed in the same manner as if this act had not been adopted.

Approved—The 11th day of July, A. D., 1923.

GIFFORD PINCHOT.

The foregoing is a true and correct copy of the Act of the General Assembly No. 416.

CLYDE L. KING
Secretary of the Commonwealth

CONTRACT FOR WORK OR LABOR

No. 22

AN ACT

Amending section twenty-one of an act, approved the fourth day of June, one thousand nine hundred and one (Pamphlet Laws, four hundred and thirty-one), entitled "An act defining the rights and liabilities of parties to, and regulating the effect of, contracts for work and labor to be done, and labor or materials to be furnished, to any building, bridge, wharf, dock, pier, bulkhead, vault, subway, tramway, toll-road, conduit, tunnel, mine, coal-breaker, flume, pump, screen, tank, derrick, pipe line, aqueduct, reservoir, viaduct, telegraph, telephone, railway or railroad line; canal, millrace; works for supplying water, heat, light, power, cold air, or any other substance furnished to the public; well for the production of gas, oil or other volatile or mineral substance; or other structure or improvement, of whatsoever kind or character the same may be; providing remedies for the recovery of debts due by reason of such contracts, and repealing, consolidating, and extending existing laws in relation thereto," in relating to service of notice of filing the claim.

Section 1. Be it enacted, &c., That section twenty-one of an act, approved the fourth day of June, one thousand nine hundred and one (Pamphlet Laws, four hundred and thirty-one), entitled "An act defining the rights and liabilities of parties to, and regulating the effect of, contracts for work and labor to be done, and labor or materials to be furnished, to any building, bridge, wharf, dock, pier, bulkhead, vault, subway, tramway, toll-road, conduit, tunnel, mine, coal-breaker, flume, pump, screen, tank, derrick, pipe line, aqueduct, reservoir, viaduct, telegraph, telephone, railway or raliroad line; canal, mill-race; works for supplying water, heat, light, power, cold air, or any other substance furnished to the public; well for the production of gas, oil, or other volatile or mineral substance; or other structure or improvement, of whatsoever kind or character the same may be; providing remedies for the recovery of debts due by reason of such contracts, and repealing, consolidating and extending existing laws in relation thereto," which reads as follows:—

"Section 21. Within one month after the filing of the claim, the claimant shall serve a notice upon the owner of the fact of the filing of the claim, giving the court, term and number, and the date of filing thereof; and shall file of record in said proceedings an affidavit setting forth the fact and manner of such service. A failure to serve such notice, and file an affidavit thereof within the time specified, shall be sufficient ground for striking off the claim," be and the same is hereby, amended to read as follows:—

Section 21. Within one month after the filing of the claim, the claimant shall serve a notice upon the owner of the fact of the filing of the claim, giving the court, term and number, and the date of filing thereof; and shall file of record in said proceedings an affidavit setting forth the fact and manner of such service. *Service of the notice may be accepted by the owner's attorney; or the claimant, his agent or attorney, may serve the notice upon the owner in any of the methods now provided for by law in the case of a summons; or, if for any cause service by any of the aforesaid methods cannot be had, then by posting the notice upon the property described in the claim and by mailing a copy thereof to the owner at his last known residence.* A failure to serve such notice *or post it,*

or have service accepted as herein provided, and to file an affidavit thereof within the time specified, shall be sufficient ground for striking off the claim.

Approved—The 5th day of April, A. D., 1917.

MARTIN G. BRUMBAUGH.

The foregoing is a true and correct copy of the Act of the General Assembly No. 22.

CYRUS E. WOODS
Secretary of the Commonwealth

ERECTION OF GARAGES

No. 400

AN ACT

Authorizing the erection of garages, fronting or opening on streets, alleys, or driveways ten feet or more in width.

Section 1. Be it enacted, &c., That, in cities of the first class, there may be erected on the rear of any lot a garage one story in height, not exceeding sixteen feet by twenty feet interior dimensions; provided said garage shall open or front on an alley or driveway not less than ten feet in width. Such garage shall be constructed of brick, stone, or hollow tile, subject to the approval of the Bureau of Building Inspection and the various regulations governing the same.

Section 2. All acts or parts of acts inconsistent herewith are hereby repealed.

Approved—The 7th day of June, A. D., 1915.

MARTIN G. BRUMBAUGH.

The foregoing is a true and correct copy of the Act of the General Assembly No. 400.

CYRUS E. WOODS
Secretary of the Commonwealth

STEAM ENGINES IN BUILDINGS

THE ACT OF ASSEMBLY

Of May 7, 1885, provides that:

No steam engine shall be erected without the inspection and approval of an Inspector as aforesaid, for the security and safety of the inhabitants, under the penalties hereinbefore prescribed in respect to buildings constructed contrary to this act, and if built in connection with any wooden or brick paned building, or in other dangerous manner contrary to the permit or direction of such Inspector, the same shall be altered or removed, according to the decree of said Court.

AN ACT

To regulate the construction, maintenance and inspection of scaffolding, or slings, hangers, blocks, pulleys, stays, braces, ladders, irons or ropes, that are used in the construction, alteration, repairing, painting, cleaning, or pointing of buildings, within the limits of cities of the first, second and third class; and providing punishment for violation of the provisions of this Act.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same: That whenever complaint is made to the Mayor, Director of Public Safety, Superintendent of Police, or other persons in charge of the police force, in any city of the first, second, or third class in this State, that the scaffolding, or slings, hangers, blocks, pulleys, stays, braces, ladders, irons, or ropes of any sling or stationary scaffolding, used in the construction, alteration, repairing, painting, cleaning, or pointing of buildings, within the limits of any city aforesaid, are unsafe, or liable to prove dangerous to life or limb of any person, such Mayor, Director of Public Safety, Superintendent of Police, or other person in charge of the police force, shall immediately cause an inspection to be made of such scaffolding, or the slings, hangers, blocks, pulleys, stays, braces, ladders, irons, ropes or other parts connected therewith. If, after examination, such scaffolding or any of such parts is found to be dangerous to life or limb, the Mayor, Director of Public Safety, Superintendent of Police, or other persons in charge of the police force, shall prohibit the use thereof, and require the same to be altered and reconstructed so as to avoid such danger. The person directed to make such inspection shall attach such certificate to the scaffolding, or the slings, hangers, irons, ropes, or other parts thereof, examined by him, stating that he has made such examination, and that he has found it safe or unsafe, as the case may be. If he declare it unsafe, he shall at once, in writing, notify the persons responsible for its erection of the fact, and warn them against the use thereof. Such notice shall be served personally upon the person responsible for the erecting, or by conspicuously affixing it to the scaffolding or part thereof to be declared unsafe. After such notice has been so served or affixed, the person responsible therefor shall immediately remove such scaffolding or part thereof, and alter or strengthen it in such manner as to render it safe, in the discretion of the person who has examined it, or his superiors. Any person whose duty it is to examine or test any scaffolding or part thereof, as required by this Act, shall have free access at all reasonable hours to any building or premises containing them, or where they may be used.

Section 2. If any scaffolding or staging, swung or suspended from an overhead support or supports, shall be more than ten feet from the ground or floor, the same shall be deemed unsuitable and improper, and as not giving proper protection to the life and limb of any person employed or engaged thereon, unless such scaffolding or staging shall, when the same is in use, have a safety-rail, rising at least thirty-four inches above the floor or main portion of such scaffolding or staging, and extending along the outside thereof the entire length of the outside thereof properly attached thereto, and unless such scaffolding or staging shall be provided with braces so as to sustain the weight of a man's body leaning against it, and prevent the scaffolding or staging from swaying from the building or structure.

Section 3. All swinging and stationary scaffolding shall be so constructed as to bear four times the maximum weight to be dependent therefrom or placed thereon when in use, and not more than three men shall be allowed on any swinging scaffolding at one time.

Section 4. Any person who violates, or omits to comply with, any of the foregoing provisions of this Act, or who suffers or permits the use of any article of scaffolding declared by a proper officer to be defective, or who destroys or defaces any notice posted in accordance with the provisions of this Act, or who hinders or obstructs any officer who may be detailed to enforce its provisions, shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine

not exceeding five hundred dollars or by imprisonment not exceeding six months, or both, at the discretion of the Court.

Section 5. All Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed.

Approved the fifteenth day of April, A. D., 1907.

EDWIN S. STUART.

PROTECTION OF WORKMEN

THE ACT

Of May 11, 1893, provides

That it shall be the duty of the party or parties having charge of the construction of any new building hereafter erected in this Commonwealth, to have the joist or girders of each floor above the third story covered with rough scaffold boards, or other suitable material, as the building progresses, so as to sufficiently protect the workmen either from falling through such joists or girders, or to protect the workmen or others who may be under or below each floor from falling bricks, tools, mortar, or other substances whereby accidents happen, injuries occur, and life and limb are endangered. For every violation of this act a penalty not exceeding one hundred (100) dollars for each floor of joists or girders left uncovered is imposed.

DIVISION FENCE AND VIEWERS

THE ACT

Of March 11, 1862, provides that

On application made to the said Board of Surveyors and Regulators the president shall, at the first meeting of said Board thereafter, appoint three members thereof, who shall within five days thereafter, proceed to view and examine any line or partition fence, and shall make out a certificate in writing, setting forth whether in their opinion the fence, if one has been already built, is lawful or otherwise; and if not lawful, or if no fence is built upon said line, then stating what proportion of costs, repairing the old or building a new fence, should be borne by each party; and in each case they shall set forth the sum each party ought to pay to the other, in case he should build or repair the other party's portion of said fence, a copy of which certificate shall be delivered to each of the parties; and they shall also present to the said Board at the next stated meeting thereafter a report of their proceedings, which report, if approved by said Board, after hearing of the parties interested, shall be final and conclusive.

All partition fences dividing inclosed lands within the rural districts of the said City of Philadelphia shall be substantially made, at least four feet six inches high, of sufficient rails or logs, the bottom rails or logs to be not more than eight inches above the ground; and in built up portions of said city, a tight board or palisaded fence, substantially built, at least six feet high; and in either case the said viewers and Board of Surveyors and Regulators shall have power to designate the kind of fence to be built: Provided, The costs in the rural districts shall not exceed twelve cents per lineal foot, and in the built up portions of said city, not exceeding twenty-five cents per lineal foot.

In all cases where a building shall be a part of such party fence the owner of the ground on which such building is erected shall be allowed for so much of said building as forms part of the partition, as

part of the whole fence in proportion to the cost of the whole, and in case the parties shall agree to divide any partition fence between them, such agreement, setting forth the kind of fence and what portion of the same each party shall make and keep in repair, shall be filed in the office of the Board of Surveyors and Regulators, to be kept as a public record. All laws applying to fence viewers or partition fences in the City of Philadelphia, as are hereby altered, amended or supplied, are hereby repealed.

THE ACT

Of March 22, 1865, provides that

If the party who shall be delinquent in making or repairing any fence in accordance with any provisions of the act to which this is a supplement shall not, within ten days after the report shall have been approved by the Board of Surveyors and Regulators, proceed to repair or build said fence, and complete the same in a reasonable time, it shall be lawful for the parties aggrieved to repair or build said fence; and if the costs for the work done and materials furnished are not paid by the delinquent party within three months after the completion of the same, a lien may be filed against the premises for said costs and expenses, which shall be of the same effect, and may be sued out and collected in the same manner as municipal claims are now by law collected.

AN ACT

Legalizing, and making it lawful to build fences constructed in whole or in part of wire along the public highways, and as division fences.

Section 1. Be it enacted, etc., That it shall and is hereby declared to be lawful for any land owner within this Commonwealth to construct, build and maintain, along any of the highways of this Commonwealth, fences made in whole or in part of wire, without barbs, subject at all times to such restrictions and prohibitions as may be imposed by the municipal authorities relative thereto.

Section 2. A fence, in whole or in part of wire, without barbs, is hereby declared to be a legal and lawful fence, within the meaning and provisions of any Act of the Legislature of this State relative to the building, constructing and maintaining of line fences, provided that such wire fence shall be of the height required by such Act or Acts. All statutes and parts of statutes inconsistent herewith be, and the same are hereby repealed.

Approved the second day of May, A. D., 1899.

WILLIAM A. STONE.

No. 213

AN ACT

Relating to division fences in suburban and similar districts of cities of the first class, regulating the nature, height, materials and kind thereof, defining the same, and in certain cases dispensing with the same on whole or parts of boundary lines; also prohibiting in the said districts the erection of fences or similar structures above a certain height, except under a permit.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same: That in all suburban districts of cities of the first class, whether the premises con-

cerned in said districts, be assessed at rural, suburban or city rates, wherever on improved premises a dwelling house has been or may be erected, that is detached or semi-detached from the dwelling house on the adjoining premises and that is separated from the street on which it fronts by an intervening front yard, lawn or space, no partition or division fence between such adjoining improved premises shall be required on or along that part of the boundary line that extends from the (house line) building line of the said detached or semi-detached dwelling houses to the sidewalk or pavement: Provided, That nothing in this Act shall prohibit any occupant or owner of any such premises from erecting a division fence on or along such part of said boundary line at his own cost: And provided, That no such fence shall be more than four feet high without a permit therefor having been first obtained from the Bureau of Building Inspection.

Section 2. That in the districts named in Section 1 hereof the division fence between adjoining improved premises required by law may be boards, palisades, pickets, palings, iron or wire, or may be a wall of brick, stone or concrete, or may be a hedge or a combination of any of these styles and materials as the owners or occupants of the said adjoining improved premises may agree. Provided, That no such fence shall be more than four feet high without a permit therefor having been first obtained from the Bureau of Building Inspection.

Section 3. That if the owners or occupants of the said adjoining improved premises cannot agree upon the nature and style of the division fence required by law to divide their premises, the Bureau of Building Inspection, on application of either of the parties concerned, shall determine the same: Provided, That unless the owners or occupants otherwise agree the total cost of the fence so determined upon by the Bureau of Building Inspection shall not exceed seventy-five cents per lineal foot, and is to be borne equally between the parties: And provided, That where several premises adjoin in their rear or side the side line of a lot fronting upon another street or otherwise, the owner or occupant of the latter lot shall not be required to have or pay for more than one style of fence on this boundary line, and the division fence required in such case shall be of uniform style and materials throughout the length of the said lot: And provided, That where, by reason of its being located at a street corner the rear of one lot adjoins the side line of any lot the law shall remain as heretofore.

Section 4. That owners or occupants of adjoining improved premises in said districts shall not be required to erect, build, plant, keep or maintain any division fence whatever upon any part of their common boundary line if they agree to dispense with and be without the same.

Section 5. That so much of Section 4 of the Act of March (first) eleventh one thousand eight hundred and sixty-two, that provided that "all partition fences dividing inclosed lands within the rural districts of the said City of Philadelphia shall be substantially made at least four feet six inches high and of sufficient rails or logs, the bottom rail or log to be not more than eight inches above the ground, and in the built-up portions of said city a tight board or palisade fence substantially built at least six feet high: Provided, The cost in the rural districts shall not exceed twelve cent per lineal foot, and in the built-up portions of said city not exceeding twenty-five cents per lineal foot," that conflicts with the provisions of Sections 1, 2, 3 and 4 hereof be, and is hereby repealed.

Approved June 22, 1917.

No. 214

AN ACT

Prohibiting the erection of fences or similar structures above a certain height in suburban and similar districts of cities of the first class, except under a permit, declaring certain fences a private nuisance and their erection a misdemeanor, and prescribing penalties for violations of the provisions of this Act.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same: That it shall be unlawful for the owner or occupant of any improved premises in any suburban district of a city of the first class (whether the premises concerned be assessed at rural, suburban or city rates), to erect any fence or structure resembling a fence upon any part of the front yard lawn or space of said premises or on or along the boundary line thereof of a greater height than four feet, if the height in excess of the said four feet is unnecessary or if the same is maliciously erected, elevated and maintained for the purpose of annoying the owner or occupant of the adjoining premises. Every such fence or structure so maliciously erected, elevated and maintained in excess of four feet in height shall be deemed and is hereby declared to be a private nuisance.

Section 2. Any person or persons erecting and maintaining the fence or structure described in Section 1 hereof as unlawful and prohibited, shall be deemed guilty of a misdemeanor, and if convicted thereof shall be punished by a fine of not less than fifty (50) dollars, nor more than two hundred (200) dollars, or by imprisonment in the county jail for not less than thirty (30) days, or not more than six (6) months, or by both fine and imprisonment to said respective amount and extent, at the discretion of the trial judge.

Approved June 22, 1917.

THE ACT

Of May 6, 1870, provides that:

From and after the passage of this Act the duties to be performed by the Board of Surveyors and Regulators of the City of Philadelphia as fence viewers, as provided by the Act of March eleventh, one thousand eight hundred and sixty-two, shall be performed by the Building Inspectors of said city, who shall have authority to fix the prices to be paid for the erection or repairs of such fences as may come under their official inspections, and they shall receive a fee of three dollars in each case, to be paid by the applicant for view.

THE ACT

Of March 11, 1862, provides that

The Board of Surveyors and Regulators of the City of Philadelphia shall, in addition to the duties now imposed upon them, perform the duties hereinafter prescribed, as fence viewers; in addition to the oath now prescribed to be taken by the said surveyors and regulators, they shall be sworn or affirmed to discharge their duties as such viewers faithfully and impartially.

PLASTERING

No. 164

AN ACT

Relative to the regulation of plastering in cities of the first and second Classes.

Section 1. Be it enacted, etc., That in cities of the first and second classes, all plastering shall be done in accordance with the provisions of this Act, and not otherwise; that is to say: All plastering in dwellings, tenements, apartments, hospitals, schools, and other buildings, when on lath, shall be known as three coat work; namely, scratch coat, brown coat and finish.

Section 2. Key space. All ceilings, stud partitions and furred walls in tenements, apartments, hospitals, schools and other buildings, where plastered with lime on wood lath, shall have not less than three-eighths space between laths. All grounds and jambs shall mean not less than seven-eighths from the stud.

Section 3. First coat, or scratch coat. First or scratch coat shall be of first quality, to be scratched thoroughly to make a key to retain second coat, and shall be thoroughly dry or set before applying second coat.

Section 4. Second coat. Second coat or brown mortar shall be of first quality. All browning must be straight, true, with no unevenness or irregularity of surface.

Section 5. Finishing. When white mortar or any other coat it shall be laid on regular, and troweled to a smooth surface, showing neither deficiencies nor brush marks.

Section 6. Cornices or coves. All cornices or coves shall be run straight, true, and smooth.

Section 7. Patent plasters. When patent plasters are used, if of wood lath, shall not be less than one-quarter inch key space. First coat shall be thoroughly scratched to make key to retain second coat, and shall be set before second coat is applied.

Section 8. Nothing in this Act shall affect the laws of this Commonwealth relative to tenement-houses in cities of the first class and second classes.

Section 9. It shall be the duty of the Bureau of Building Inspection in said cities to enforce the provisions of this Act. It shall be the duty of the Councils of said cities to enact such ordinances as may be necessary for the proper enforcement of this Act, and to prescribe reasonable penalties for non-compliance therewith. Any inspector appointed in pursuance of the provisions of this Act, or in pursuance with the provisions of any such ordinance, shall be a competent plasterer of at least ten years' practical experience.

Section 10. This Act shall take effect on the first day of January, one thousand nine hundred and fourteen.

Section 11. All Acts and parts of Acts inconsistent with the provisions of this Act are hereby repealed.

Approved the twentieth day of May, A. D., 1913.

JOHN K. TENER.

Classified Building Trade Directory

of the

PHILADELPHIA BUILDING CODE

A Dependable List
of those who are in position to supply

MATERIAL
EQUIPMENT or SERVICE

entering into building construction in
Philadelphia, Penna.

ACETYLENE BURNING

Orth, G. P.....523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 302)
Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
(See advertisement page 142)

ACOUSTICS

Johns-Manville, Inc......1317 Race St.
Rittenhouse 7850 Race 1036
Zellfelder, Albert.....1324 Walnut St.
Pennypacker 1150

ACOUSTIC ENGINEERS
(See Engineers—Acoustic)

AETNA OIL BURNERS

Burns, Judson C., Inc...11 & Chestnut Sts.
Rittenhouse 1500

AIR COMPRESSORS

Bastian Compressor Manufacturers
5429 N. 2d St.
Waverly 4610
Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)
Grain Pump & Lumber Co...17 N. 7th St.
Lombard 9525 Main 9184
Plumbers' Roadway Breaking Co.
Dover & Somerset Sts.
Columbia 7654
(See advertisement page 102)
Schramm, Inc......709 Arch St.
Lombard 7795
Staley & Morris, Inc......214 N. 22d St.
Rittenhouse 5160
Ward, Lee T., Co......619 Filbert St.
Lombard 9009

AIR COMPRESSORS—RENT AIR COMPRESSORS

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)
Metalweld, Inc...2617 Hunting Park Ave.
Tioga 8440 Park 5395
West Phila. Air Compressor Co.
4820 Reno Ave.
Belmont 6683

AIR CONDITIONING APPARATUS

Atmospheric Conditioning Corp.
Land Title Bldg.
Rittenhouse 5586
Carrier Engineering Corp.
Land Title Bldg.
Rittenhouse 5586 Race 7836
Reed, Wm., Engineering Co., Inc.
2013 Sansom St.
Rittenhouse 8262
Spray Engineering Co...1015 Chestnut St.
Walnut 3068
American Moistening Co..414 Walnut St.
Lombard 6794

AIR FILTERS
(See Filters—Air Filters)

ALARMS—FIRE
(See Fire Alarms)

ALL STEEL PRODUCTS
Desks, Filing Cabinets, Office Equipment, Safes, Shelving

General Fireproofing Co...Packard Bldg.
Rittenhouse 2422
Ambler Asbestos Products
Asbestos Shingles
" Building Lumber
" Corrugated Roofing & Siding
" Tile—Mission & Spanish
" Lumber, ebonized
Ambleroid Cold Moulded Parts
Ambler Linabestos
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 36)

ANCHORS

Associated Iron Works....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

ART METAL PRODUCTS

Art Metal Construction Co.
9th & Sansom Sts.
Walnut 2356

ART METAL WORK

Shannon Metalcraft Corp...11 Letitia St.
Walnut 2396
(See advertisement page 74)

ART METAL WORK—Continued

Eisele, Louis F. & Son..2356 Albion St.
Columbia 1689 Park 1884
Giese Art Metal Works.621 Commerce St.
Lombard 7738
Kawneer Co.....Central Trust Bldg.
Market 2847 Main 5818
Pierce Hollingsworth Studio
34 S. 16th St.
Rittenhouse 4585
Yellin, Samuel.....5520 Arch St.
Granite 3140 West 4936

ARTESIAN WELL DRILLERS
(See Well Drilling—Artesian)

ARTIFICIAL STONE
(See Stone—Cast Stone)

ASBESTOS BOILER COVERING
(See Boiler Covering—Asbestos)

ASBESTOS CEMENT

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

ASBESTOS LUMBER

Asbestos Shingle Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)
Horrocks Iron Works...1435 N. 31st St.
Stevenson 4141 Park 1041
Philadelphia Asbestos Co.
2010 N. 10th St.
Columbia 5434 Park 4065

ASBESTOS MILLBOARD

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

ASBESTOS PAPER
(See Paper—Asbestos)

ASBESTOS PIPE COVERING
(See Pipe Covering—Asbestos)

ASBESTOS PRODUCTS

Aetna Asbestos Insulation & Roofing Co.
1234 Callowhill St.
Spruce 5830
(See advertisement page 64)
Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)
Central Asbestos Co.....828 N. 4th St.
Market 3078 Park 1465
(See advertisement page 69)
Krewson Asbestos Co.....542 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)
Eternite, Inc.....15th & Locust Sts.
Pennypacker 4525
Penn Asbestos Co.....385 Conaroe St.
Roxborough 1075

ASBESTOS SHEETS

Asbestos Shingle Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Carey, Philip, Co....24th & Sedgley Ave.
Tioga 8576 Park 5408

ASBESTOS SHINGLES
(See Shingles—Asbestos)

ARCHITECTS

Abel, Victor D.....Otis Bldg.
Rittenhouse 1860
Abramson, Samuel.....2315 Walnut St.
Rittenhouse 9860 Race 6597
Adams, Alex. Mackie....1012 Walnut St.
Pennypacker 5361
Adams, Clyde S.....2038 Spruce St.
Spruce 2571
Antrim, Walter.....220 S. 16th St.
Pennypacker 6830
Architects Service Co...1711 Sansom St.
Rittenhouse 4989
Architectural House Planning Service Co.
28 S. 18th St.
Rittenhouse 5930
Ash, Thomas Edw.....1700 Walnut St.
Pennypacker 8775 Race 7176
Ash, Thomas Edw...2021 Chancellor St.
Spruce 0938
Ashmead, Duffield, Jr.....20 S. 15th St.
Spruce 0474
Baily, William L.....421 Chestnut St.
Lombard 0736
Baily & Bassett.....421 Chestnut St.
Lombard 0736

ARCHITECTS—Continued

Baker, Cornelius S.
Insurance Co. of N. America Bldg.
Rittenhouse 8326

Ballinger Co.
Belmont Ave. & Conshohocken Rd.
Belmont 8524

Ballinger Co., The..12th & Chestnut Sts.
Pennypacker 5800 Race 7481

Ballinger, Robert I...12th & Chestnut St.
Pennypacker 5800

Banwell, Roy Wendell..1805 Walnut St.
Spruce 7161

Barnes, Amos W.....Perry Bldg.
Rittenhouse 8948

Barney, Wm. Pope.....1805 Walnut St.
Spruce 7161

Barthmaier, Eugene V...1518 Walnut St.
Pennypacker 5563

Bassett, David B.....1522 Locust St.
Pennypacker 8267 Race 1040

Bassett, George G.....421 Chestnut St.
Lombard 0736

Baum, George C. ofc. of....1511 Arch St.
Spruce 1539

Baylinson, S. Brian.....629 Chestnut St.
Lombard 5617 Main 6715

Bechtel, David S.....136 S. 4th St.
Lombard 5434

Bencker, Ralph B....13th & Chestnut St.
Rittenhouse 3813 Race 4028

Berger, Carl P.....1512 Walnut St.
Pennypacker 2987

Bernhardt, Max A.....127 S. 18th St.
Rittenhouse 5831

Berry, Frank A.....1321 Arch St.
Rittenhouse 2450

Bertolett, Edwin F.....127 S. 18th St.
Rittenhouse 5831

Bickley, George Howard...20 S. 15th St.
Spruce 0474

Bieber, Alvin C.....Bonbright Bldg.
Pennypacker 4148 Race 1563

Bissell, E. P.....1520 Locust St.
Pennypacker 8214

Bissell & Sinkler.....1520 Locust St.
Pennypacker 8214

Blithe, Wesley L....Public Ledger Bldg.
Lombard 6287

Blum, Nat Stanford.....858 S. 55th St.
Sherwood 0466

Boggs, Edw. T.....225 S. 6th St.
Lombard 5632

Bolton, Chas. L.....Schaff Bldg.
Rittenhouse 8993

Bolton, Chas. W. & Son.....Schaff Bldg.
Rittenhouse 8993

Borie, C. L., Jr.....Otis Bldg.
Rittenhouse 7566

ARCHITECTS—Continued

Borie, C. L., 3d.....Otis Bldg.
Rittenhouse 7566

Borzner, A. C.....717 Walnut St.
Walnut 3086 Main 2187

Boyd, Abel & Gugert.....Otis Bldg.
Rittenhouse 1860

Boyd, D. Knickerbacker.....Otis Bldg.
Rittenhouse 6537

Boyd, Lawrence Visscher.Harrison Bldg.
Rittenhouse 4729

Bright, John Irwin.....Otis Bldg.
Rittenhouse 5765

Brockie, Arthur H.....254 S. 15th St.
Pennypacker 2535

Brugger, John T.....Public Ledger Bldg.
Lombard 3980

Brumbaugh, G. Edwin..RI. Est. Tr. Bldg.
Pennypacker 0511

Bullock, John Emlen....142 Allens Lane
Chestnut Hill 3362

Bunting, Morgan.....603 Chestnut St.
Lombard 6915

Bunting & Shrigley....603 Chestnut St.
Lombard 6915

Bureau Architecture, M. E. Church
1701 Arch St.
Rittenhouse 1547

Burke, Wm. M.....250 S. Broad St.
Pennypacker 2636

Cain, Herbert L.....1718 Cherry St.
Spruce 5328

Campbell, Wm. M.....1713 Sansom St.
Rittenhouse 3786

Carlin, John J.....Drexel Bldg.
Lombard 2637

Carroll, Armond.....Schaff Bldg.
Rittenhouse 4554

Carroll, John J.....1619 Chestnut St.
Rittenhouse 9951

Carswell, Harold T.....Cunard Bldg.
Pennypacker 5753

Casey, George W.....315 S. 15th St.
Pennypacker 8126

Caspary, Clarence L...Corn Exch. Bldg.
Rittenhouse 6428 Race 5558

Castor, Horace W...Stephen Girard Bldg.
Rittenhouse 2248

Catharine, Irwin T..Franklin Trust Bldg.
Rittenhouse 6919

Catharine, Irwin T..Franklin Trust Bldg.
Rittenhouse 6870

Chance, Geo. Whitefield..Harrison Bldg.
Rittenhouse 0675

Chapman, O. C.....524 Walnut St.
Lombard 5408

Chapman & Fisher.....524 Walnut St.
Lombard 5408

ARCHITECTS—Continued

Charr, William L.....Victory Bldg.
Walnut 1594
Churchman, C. Wharton.....Otis Bldg.
Rittenhouse 6677
Clark, J. Frank...3514 Spring Garden St.
Evergreen 7459
Coates, Sherman G.....1935 Chestnut St.
Rittenhouse 0328
Colton, R. L.....Bonbright Bldg.
Pennypacker 2467
Conarroe, J. Linerd..Mutual Trust Bldg.
Pennypacker 7422
Coneys, John L.....Drexel Bldg.
Lombard 2637
Conver, S. S. .....Otis Bldg.
Rittenhouse 6354
Cope & Stewardson.....315 S. 15th St.
Pennypacker 8084
Cornell, Howard E.....Ledger Bldg.
Lombard 1215
Cornell & Matthews.....Ledger Bldg.
Lombard 1215
Coscia, Henry.....1504 Locust St.
Pennypacker 4551
Cret, Paul P.....112 S. 16th St.
Rittenhouse 1354
Same.....1523 Chestnut St.
Locust 5890
Davis, Dunlap & Barney.1805 Walnut St.
Spruce 7161
Davis, Paul A., 3d.....1805 Walnut St.
Spruce 7161
DeArmond, Ashmead & Bickley
20 S. 15th St.
Spruce 0474
DeArmond, Clarence.....20 S. 15th St.
Spruce 0474
Degit, Henry D. & Son....1329 Race St.
Rittenhouse 7989
Demchick, Israel.....1701 Chestnut St.
Rittenhouse 7183
DeMoll, Carl.....12th & Chestnut Sts.
Pennypacker 5800 Race 7481
Dobbins, Albert N.....1718 Cherry St.
Spruce 5328
Donohoe, W. W. .....266 S. 5th St.
Pennypacker 7439 Race 1475
Dreher, Frederick W.....Otis Bldg.
Rittenhouse 6677
Dreher & Churchman.....Otis Bldg.
Rittenhouse 6677
Druckenmiller & Williams....Otis Bldg.
Rittenhouse 4918
Duhring, H. Louis.....1309 Locust St.
Pennypacker 7732 Race 4555
Dull, John J.....1524 Chestnut St.
Rittenhouse 8304

ARCHITECTS—Continued

Dunlap, M. Edmunds...1805 Walnut St.
Spruce 7161
Durang, F. Ferdinand..56th & City Line
Belmont 10192
Same.....1220 Locust St.
Pennypacker 7026
Durham Bros.....34 S. 17th St.
Rittenhouse 5706 Race 3852
Durham, Walter.....312 S. Broad St.
Pennypacker 7563
Dyer, W. E. S......Land Title Bldg.
Rittenhouse 5354
Early, Edwin A.....1511 Arch St.
Spruce 1539
Easby, Lewis W.....1935 Chestnut St.
Rittenhouse 0328
Eberhard, Victor.....603 Chestnut St.
Lombard 6882
Edkins, George E.....1520 Locust St.
Pennypacker 7493
Edmunds, Franklin D...Rl. Est. Tr. Bldg.
Pennypacker 2847
Edwards, E. Nelson.....315 S. 15th St.
Pennypacker 7564
Edwards & Green.....34 S. 17th St.
Rittenhouse 6349
Edwards & Hoffman.....315 S. 15th St.
Pennypacker 7564
Ellsworth, Walter C.....226 S. 15th St.
Pennypacker 0144
Emmert, L. de Forest.....1511 Arch St.
Spruce 1539
Erskine, Richard.....1716 Cherry St.
Rittenhouse 8593
Evans, Edmund C.....1506 Locust St.
Pennypacker 0330
Eyre, Wilson.....1003 Spruce St.
Pennypacker 5242
Fein, Morris.....City Centre Bldg.
Rittenhouse 6933
Fetterolf, Edwin H.....1524 Chestnut St.
Rittenhouse 5889
Fielding, Mantle.....520 Walnut St.
Lombard 3359
Fieldstein, J. Ethan.....Otis Bldg.
Rittenhouse 6152
Fisher, Albert.....6027 Larchwood Ave.
Sherwood 0157
Folsom, Donald.....10 S. 18th St.
Rittenhouse 8297
Folsom, Stanton & Graham.10 S. 18th St.
Rittenhouse 8297
Frank, J. Horace..Real Estate Tr. Bldg.
Pennypacker 3986
Fries, Christian H.
Frankford & Oxford Aves.
Delaware 2851

ARCHITECTS—Continued

Frishmuth, Anna Biddle..1700 Walnut St.
Pennypacker 2495
Fuller, J. S.....26 S. 15th St.
Rittenhouse 7443 Race 2310
Furber, Wm. Copeland.....133 S. 4th St.
Lombard 5859
Furness, Evans, & Co.....315 S. 15th St.
Pennypacker 8126
Furstenau, M. C.....Mar. & Mer. Bldg.
Lombard 2789
Gallucci, N. G.....7901 Eastwick Ave.
Woodland 6699
Gallucci, Nicholas G. ....1506 Locust St.
Pennypacker 0330
General Engineering & Development Co.
929 Chestnut St.
Walnut 4878
Getz, Peter F.....Victory Bldg.
Walnut 4488
Gilchrist, Edmund B....1618 Latimer St.
Pennypacker 8096
Gill, Robert L...5600 Germantown Ave.
Germantown 3904
Gilmore, Chas. Willis....1518 Walnut St.
Pennypacker 5563
Gleeson, Raymond.....250 S. Broad St.
Pennypacker 2636
Gleeson & Mulrooney...250 S. Broad St.
Pennypacker 2636
Goldbergh, Ralph L.....266 S. 15th St.
Pennypacker 4381 Race 1475
Graham, John, Jr.....10 S. 18th St.
Rittenhouse 8297
Greisler, Fred N......1035 Walnut St.
Pennypacker 5756
Groben, W. Ellis.....1051 69th Ave.
Waverly 5790
Gugert, Francis A.....Otis Bldg.
Rittenhouse 1860
Hahn, Frank E.....629 Chestnut St.
Lombard 5617 Main 6715
Hall, Arthur W.....Lewis Bldg.
Pennypacker 7285 Race 7588
Hammer, H. G...1716 Spring Garden St.
Poplar 1918
Harbeson, John F.....112 S. 16th St.
Rittenhouse 1354
Harris, Jas. Russell....603 Chestnut St.
Lombard 6882 Main 1947
Harris, John McArthur....Drexel Bldg.
Lombard 2370
Harris & Richards.....Drexel Bldg.
Lombard 2370
Hawley, Samuel D.....1700 Walnut St.
Pennypacker 9217
Heacock & Hokanson..1211 Chestnut St.
Rittenhouse 0767

ARCHITECTS—Continued

Helick, Dr. Chauncey G.
16th & Oxford Sts.
Stevenson 8328
Hendrickson, E. E.....1429 Walnut St.
Rittenhouse 6637
Henon, Daniel T.....Finance Bldg.
Rittenhouse 0378
Henon, Paul J., Jr.....Finance Bldg.
Rittenhouse 0378 Race 5296
Hersam, C. O.....5601 Germantown Ave.
Germantown 5685
Hesser, Paul M. Jr.....225 S. 6th St.
Lombard 9433
Hill, A. D.....130 S. 15th St.
Rittenhouse 7671 Race 7669
Hillman, Chas. L. & Son.400 Chestnut St.
Lombard 3745
Hodgens, H. Childs, Inc...130 S. 15th St.
Rittenhouse 7671 Race 7669
Hoekstra, Jesse T.....1713 Sansom St.
Locust 3977
Hoffman, Edw. F., Jr.....315 S. 15th St.
Pennypacker 7564
Hoffman-Henon Co......Finance Bldg.
Rittenhouse 0378
Hoffman-Henon Co., fld. ofc.
Kensington Ave. & Cumberland St.
Nebraska 9974
Hoffman-Henon Co., genl. fld. ofc.
20th & Market Sts.
Rittenhouse 0378
Hokanson, Oscar M....1211 Chestnut St.
Rittenhouse 0767
Howard, A. C.....1429 Walnut St.
Rittenhouse 6637
Howe, George.....205 S. Juniper St.
Pennypacker 1172
Huberti, John A.....2645 N. 6th St.
Regent 3193
Hulme, Norman.....1524 Chestnut St.
Rittenhouse 8304
Huston, Jos. M.....Presser Bldg.
Rittenhouse 6764
Idell, George S.....Corn Exchange Bldg.
Rittenhouse 6428
Jackson, W. E.....1003 Spruce St.
Pennypacker 5242
Jenkins, David H., Jr...1208 Chestnut St.
Pennypacker 1543
Johnson, Lindley.....Harrison Bldg.
Spruce 5171
Johnson, Philip H.
Holmesburg & State Rd.
Holmesburg 2307
Johnson, Philip H.....Widener Bldg.
Rittenhouse 3770
Kaplan, Solomon.....10 S. 18th St.
Rittenhouse 6025 Race 9907

ARCHITECTS—Continued

Karcher, Walter T.....1520 Locust St.
Pennypacker 5941
Karcher, Walter T. & Livingston Smith
1520 Locust St.
Pennypacker 5941
Keen, Chas. Barton..338 S. Smedley St.
Pennypacker 7035
Kellogg, Thomas M.....1805 Walnut St.
Rittenhouse 6280
Kelsey, Albert.....Otis Bldg.
Rittenhouse 1860
Kerns, Richard A., Jr.....109 S. 22d St.
Spruce 1531
Keyes, John W.....112 S. 16th St.
Rittenhouse 2139 Race 1040
Kirkpatrick, Donald M.....220 S. 16th St.
Pennypacker 6830
Klaisz, Harold M.....225 S. 6th St.
Lombard 9433
Klauder, Chas. Z.....1429 Walnut St.
Rittenhouse 6637
Kleinfelder, Herman E....315 S. 15th St.
Pennypacker 8126
Kline, Herman H.....709 Chestnut St.
Lombard 2253
Koelle, Wm. F. B.....Otis Bldg.
Rittenhouse 1977
Koenig, Franz C.....4920 Parkside Ave.
Belmont 0782
Kuebler, C. Fred., Jr.....1600 Arch St.
Rittenhouse 1864 Race 1935
Lacey, Adin Benedict....1012 Walnut St.
Pennypacker 5361
Lee, W. H.....Schaff Bldg.
Rittenhouse 4554 Race 1116
Levi, Louis.....Real Estate Trust Bldg.
Pennypacker 3646
Levin, I. W.....1011 Chestnut St.
Walnut 6773
Levy, Abraham.... ..313 S. Smedley St.
Pennypacker 3397
Lewis, Stanford B.....Presser Bldg.
Rittenhouse 6764
Lippincott, Thomas B.....11 S. 16th St.
Locust 6051 Race 1359
Loos, Richard C.....2218 Chestnut St.
Rittenhouse 3573
Lovatt, George I.....223 S. Sydenham St.
Pennypacker 8511
Love, S. Arthur, Jr.
Juniper & Walnut Sts.
Pennypacker 1508
Lowery, Joseph F.....Land Title Bldg.
Rittenhouse 7235
MacKenzie, Lewis P...Bankers Tr. Bldg.
Pennypacker 5990
MacKenzie & Wiley..Bankers Tr. Bldg.
Pennypacker 5990

ARCHITECTS—Continued

Magaziner, Eberhard & Harris
603 Chestnut St.
Lombard 6882
Magaziner, Louis.....603 Chestnut St.
Lombard 6882
Malatesta, Leo Rosatto..1919 N. 61st St.
Belmont 7558 Main 1947
Margolis, Joseph.....Fuller Bldg.
Rittenhouse 9370 Race 9851
Martin, E. Wm.....1506 Locust St.
Pennypacker 0330
Martin, Robert C.....Otis Bldg.
Rittenhouse 6677
Martin, Sydney E.....220 S. 16th St.
Pennypacker 6830
Matthewson, Ernest J.....Bulletin Bldg.
Spruce 4676
McGoodwin, Robert Rodes
16th & Walnut Sts.
Pennypacker 4896
McIlvain, Chas. J., Jr.....112 S. 16th St.
Locust 0701
McIlvain & Roberts.....112 S. 16th St.
Locust 0701
McIlvaine, J. Gilbert....1003 Spruce St.
Pennypacker 5242
McLanahan M. Hawley
Bellevue Ct. Bldg.
Pennypacker 4553
Mecaskey, Richard W.....Otis Bldg.
Rittenhouse 1860
Medary, M. B., Jr.....Otis Bldg.
Rittenhouse 7566
Medoff, Ezekiel B.....Fox Bldg.
Rittenhouse 3120
Megrail, Alfred H.....1309 Locust St.
Pennypacker 7865
Meigs, Arthur I.....205 S. Juniper St.
Pennypacker 1172
Mellor, Walter.....205 S. Juniper St.
Pennypacker 1172
Mellow, Meigs & Howe
205 S. Juniper St.
Pennypacker 1172
Miller, Herman.....Crozer Bldg.
Rittenhouse 4118
Miller, T. Frank.....1012 Walnut St.
Pennypacker 0676
Mills & VanKirk.....Harrison Bldg.
Rittenhouse 1574
Millner, Samuel D...4616 Frankford Ave.
Delaware 1896
Monaghan, Paul.....1518 Locust St.
Pennypacker 1943 Race 5061
Morris & Erskine.....1716 Cherry St.
Rittenhouse 8953
Mucklow, Evans S. .....629 Chestnut St.
Lombard 5617 Main 6715

ARCHITECTS—Continued

Mueller, Arnold.....901 Walnut St.
Pennypacker 5130
Mulrooney, Thos F.....250 S. Broad St.
Pennypacker 2636
Naschold, Jacob.....5234 N. 2d St.
Michigan 4532
Neely, Richard R.....23d & Spruce Sts.
Spruce 6450
Neff, C. F.....12th & Locust Sts.
Pennypacker 7423
Neubauer, Stanley K.....929 Chestnut St.
Walnut 4878
Neubauer, Stanley K. fld. ofc.
1605 W. Allegheny Ave.
Tioga 9302
Neubauer & Supowitz...929 Chestnut St.
Walnut 4878
Nickels, Frank V.....15 S. 21st St.
Rittenhouse 4915 Race 2221
North, Chas. H.....1711 Sansom St.
Rittenhouse 4989
Oelschlager, Chas. E.....1615 Walnut St.
Rittenhouse 9310
Okie, R. Brognard....306 S. Smedley St.
Pennypacker 7973
Otto, Karl F......1828 Arch St.
Spruce 5552
Page, Geo. Bispham.....315 S. 15th St.
Pennypacker 8084
Pappano, D. J.....13th & Reed Sts.
Oregon 3367
Parker, Henry.....1120 Locust St.
Pennypacker 1180
Parry, Oliver Randolph..1524 Sansom St.
Rittenhouse 5784
Peddle, Chas. R.....136 S. 4th St.
Lombard 3938
Penwood Co.....City Centre Bldg.
Rittenhouse 6933 Race 1429
Pepper, G. Wharton, Jr...1520 Locust St.
Pennypacker 9170 Race 6029
Perot, Robeson Lea.....137 Harvey St.
Germantown 2567
Perrot, Emile G......Boyertown Bldg.
Spruce 9814 Race 2409
Phillips, Watson K.....213 S. 5th St.
Lombard 1891
Plack, W. L.....12th & Locust St.
Pennypacker 7423
Poggi & Winters.....Equitable Bldg.
Pennypacker 1369
Pollock, Robert W.....8 S. Hicks St.
Spruce 3682
Potter, Wm. Woodburn. Rl. Est. Tr. Bldg.
Pennypacker 5057
Pratt, Roy G.....Guaranty Bldg.
Pennypacker 8652

ARCHITECTS—Continued

Pratt, Roy G., Inc.....Guaranty Bldg.
Pennypacker 8652 Race 0083
Price, Llewellyn.....243 S. Quince St.
Pennypacker 4620
Price, Walter F.....119 S. 4th St.
Lombard 1233
Price, Wm. W.....119 S. 4th St.
Lombard 1233
Price & Walton.....119 S. 4th St.
Lombard 1233
Purves & Day.....315 S. 15th St.
Pennypacker 8126
Rabenold, Chas. F.....1524 Chestnut St.
Rittenhouse 3562
Rackie, John H.....4341 Frankford Ave.
Jefferson 8977
Rankin, John Hall.....1805 Walnut St.
Rittenhouse 6280
Rankin & Kellogg.....1805 Walnut St.
Rittenhouse 6280
Read, Chas. N.....222 S. 15th St.
Pennypacker 9058
Register, Bartol.....1520 Locust St.
Pennypacker 9170 Race 6029
Rehfuss, Geo. U.....1711 Sansom St.
Rittenhouse 4989
Reinhold, Henry L., Jr...1632 Walnut St.
Pennypacker 8022
Richards, Howard S.....Drexel Bldg.
Lombard 2370
Richards, L. M. .....Lafayette Bldg.
Lombard 0658
Richter, Jean Paul ....12 & Chestnut Sts.
Pennypacker 5800 Race 7481
Ritter, Verus T. .....Packard Bldg.
Rittenhouse 2113
Ritter & Shay .....Packard Bldg.
Rittenhouse 2113
Ritter & Shay .....1500 Walnut
Pennypacker 9370
Robbins, George A. .....Otis Bldg.
Rittenhouse 0324
Robert, Charles H. .....112 S. 16th St.
Locust 0701
Roberts, Spencer .....10 S. 18th St.
Locust 5013
Rommel, Frank A. .....1524 Chestnut St.
Rittenhouse 5889
Rorke, Edwyn .....1511 Locust St.
Pennypacker 4320
Rossell & Thayer ....Witherspoon Bldg.
Pennypacker 8459
Roth, Edward A. .....Drexel Bldg.
Lombard 2562
Roth, G. B. .....1629 Chestnut St.
Rittenhouse 6568

ARCHITECTS—Continued

Rothschild, Edwin L.
Bankers Trust Bldg.
Pennypacker 5531
Rothschild, LeRoy B. ...215 S. Broad St.
Pennypacker 8820
Rush, Louis H. .....1520 Locust St.
Pennypacker 6434
Sauer, Andrew J. .....Schaff Bldg.
Rittenhouse 7447
Sauer, Andrew J. & Company
Schaff Bldg.
Rittenhouse 7447 Race 5839
Savage, George E. ..Witherspoon Bldg.
Pennypacker 4399
Savery, Addison H. .....1309 Locust St.
Pennypacker 7865
Savery, Albert H. ..Stephen Girard Bldg.
Rittenhouse 2179 Race 1909
Savery & Scheetz ..Stephen Girard Bldg.
Rittenhouse 2179 Race 1909
Schaef, Charles F. .....11 S. 16th St.
Locust 6051 Race 1359
Scheetz, William C.
Stephen Girard Bldg.
Rittenhouse 2179 Race 1909
Schenck, Albert F. .....Harrison Bldg.
Rittenhouse 6643
Scherr, L. Valentine .....Drexel Bldg.
Lombard 2637
Scheuringer, Charles A.
1211 Chestnut St.
Rittenhouse 0767
Schoeppe, Edward .....1437 Spruce St.
Pennypacker 6732 Race 4506
Schoppe, Horace G. ....515 Pelham Rd.
Germantown 3538
Schoppe, Horace G. ....515 Pelham Rd.
Germantown 3538
Schwacke, John S. .....1805 Walnut St.
Rittenhouse 6280
Seeburger, Frank .....1524 Chestnut St.
Rittenhouse 3562
Sellers, Horace Wells
Stephen Girard Bldg.
Rittenhouse 0268
Sharpley, Walter Williams
225 E. Washington Square
Lombard 6649
Shay, Howell Lewis .....Packard Bldg.
Rittenhouse 2113
Shrigley, Arthur .....603 Chestnut St.
Lombard 6915
Shulman, Benjamin .....1722 Arch St.
Spruce 9706
Silverman, Edwin H. ..313 S. Smedley St.
Pennypacker 3397
Silverman & Levy ....313 S. Smedley St.
Pennypacker 3397

ARCHITECTS—Continued

Simon, Edward P. ....249 S. Juniper St.
Pennypacker 0277 Race 6241
Simon, Grant M. ....249 S. Juniper St.
Pennypacker 0277 Race 6241
Simon & Simon .....249 S. Juniper St.
Pennypacker 0277
Simons, George J. ....929 Chestnut St.
Walnut 4163 Race 6241
Sims, Joseph P. .....126 S. 18th St.
Rittenhouse 1579
Sindoni, John E.
McKean & Norwood Sts.
Jackson 0527
Sinkler, John P. B. .....1520 Locust St.
Pennypacker 8214
Smedley, Walter ..Stephen Girard Bldg.
Rittenhouse 0126
Smith, Livingston .....1520 Locust St.
Pennypacker 5941
Stackhouse, H. Rex .....266 S. 15th St.
Pennypacker 7439 Race 1475
Stanton, Wm. C. .....10 S. 18th St.
Rittenhouse 8297 Race 9684
Stanton, William Macy .Land Title Bldg.
Rittenhouse 1697 Race 9684
Stearns, George R.
Stephen Girard Bldg.
Rittenhouse 0614 Race 9835
Stearns & Woodnutt
Stephen Girard Bldg.
Rittenhouse 0614 Race 9835
Stern, Adiel Martin .....413 N. 38th St.
Evergreen 2698
Sternfeld, Harry .....Otis Bldg.
Rittenhouse 5765
Stetler, Jesse L. .....709 Chestnut St.
Lombard 1617
Stetler & Deysher .....709 Chestnut St.
Lombard 1617
Stevens, Benjamin R .....1827 Arch St.
Spruce 1695
Stewardson, E. L. .....315 S. 15th St.
Pennypacker 8084
Stewardson & Page .....315 S. 15th St.
Pennypacker 8084
Stewart, Stanley Potter
Land Title Bldg.
Rittenhouse 1697 Race 7142
Stinson, George W.
12th and Chestnut Sts.
Pennypacker 5800 Race 7481
Stopper, Eugene A. .....Fuller Bldg.
Rittenhouse 8631 Race 3455
Street, J. Fletcher .....1120 Locust St.
Pennypacker 1180
Strickland, Blodget & Law .222 S. 15th St.
Pennypacker 9058

ARCHITECTS—Continued

Stuckert, F. Russell .....1600 Arch St.
Rittenhouse 1864
Stuckert & Co. .....1600 Arch St.
Rittenhouse 1864 Race 1935
Sullivan, W. F. .....28 S. 18th St.
Rittenhouse 5930
Supowitz, David .....929 Chestnut St.
Walnut 4878
Talbutt, James F. .....126 S. 18th St.
Rittenhouse 1579
Taylor, Ellery K. .....1429 Walnut St.
Rittenhouse 6637
Taylor, John Howard ....1520 Locust St.
Pennypacker 9170
Thalheimer, Clarence S. ....10 S. 18th St.
Rittenhouse 7894 Race 9828
Thalheimer & Weitz .....10 S. 18th St.
Rittenhouse 7894
The Ballinger Co.
12th and Chestnut Sts.
Pennypacker 5800
Thomas Martin & Kirkpatrick
220 S. 16th St.
Pennypacker 6830
Thomas, Walter H. .....220 S. 16th St.
Pennypacker 6830
Thompson, J. W. .....703 S. 60th St.
Granite 1740
Thompson, William Heyl
1520 Locust St.
Pennypacker 7493
Thomson, John B. .....34 S. 17th St.
Rittenhouse 6349
Tilden, Marmaduke, Jr. ..1520 Locust St.
Pennypacker 9170 Race 6029
Tildon, Register & Pepper
1520 Locust St.
Pennypacker 9170 Race 6029
Tillion & Tillion .....Equitable Bldg.
Pennypacker 1369
Tonk, Louis Jos. .....Fuller Bldg.
Rittenhouse 9370 Race 9851
Trout, Wetherill P. ....243 S. Quince St.
Pennypacker 4620
Trout & Truscott .....243 S. Quince St.
Pennypacker 4620 Race 3052
Trumbauer, Horace ....Land Title Bldg.
Rittenhouse 8787
Truscott, Dale .....243 S. Quince St.
Pennypacker 4620
Tunis, Louis J. Insurance Co.
North American Bldg.
Rittenhouse 8326
Tunis & Baker Insurance Company
North American Bldg.
Rittenhouse 8326
Tyre, Philip S. .....114 S. 15th St.
Rittenhouse 7667 Race 2736

ARCHITECTS—Continued

VanKirk, Walter M. ....Harrison Bldg.
Rittenhouse 1574
Wadsworth, R. J. .....1520 Locust St.
Pennypacker 8214
Walker, John A. .....Cunard Bldg.
Pennypacker 5753
Walker & Carswell .....Cunard Bldg.
Pennypacker 5753
Wallace, Brenton G.
Franklin Trust Bldg.
Rittenhouse 9153
Wallace & Warner ..Franklin Trust Bldg.
Rittenhouse 9153
Walton, W. McKee .....119 S. 4th St.
Lombard 1233
Ward, Alfred Lewis
Stephen Girard Bldg.
Rittenhouse 2868
Warner, Fred G. ..Franklin Trust Bldg.
Rittenhouse 9153
Wassermann, Simon .....136 S. 4th St.
Lombard 3938
Watson, Frank R. .....1520 Locust St.
Pennypacker 7493
Watt, William R. .....1504 Locust St.
Pennypacker 4551
Watt & Coscia .....1504 Locust St.
Pennypacker 4551
Webber, Harold .....1530 Locust St.
Pennypacker 7850
Webber & Wurster .....1530 Locust St.
Pennypacker 7850
Weidel, Henry Foster ..1700 Walnut St.
Pennypacker 8775
Weitz, David D. .....10 S. 18th St.
Rittenhouse 7894 Race 9828
Weldon, H. B. .....1817 Callowhill St.
Locust 0360
Westover, Albert E. .....109 S. 22d St.
Spruce 1531 Race 1285
White, Ralph E. ....Pennsylvania Bldg.
Rittenhouse 5666
Wightman, Edgar A.
Bankers Trust Bldg.
Pennypacker 5391
Wiley, Joseph H. ..Bankers Trust Bldg.
Pennypacker 5990
Williams, Carl H. .....Otis Bldg.
Rittenhouse 4918
Willing, Charles .....126 S. 18th St.
Rittenhouse 1579
Willing, Sims & Talbutt ..126 S. 18th St.
Rittenhouse 1579
Wilson, E. Allen .....1208 Chestnut St.
Pennypacker 1543
Wilson, Eyre & McIlvaine
1003 Spruce St.
Pennypacker 5242

ARCHITECTS—Continued

Windrim, John I. ..Commonwealth Bldg.
Rittenhouse 2475
Wise, Herbert C. .....1429 Walnut St.
Rittenhouse 6637
Woodnutt, C. E. ...Stephen Girard Bldg.
Rittenhouse 0614 Race 9835
Wooley, J. Bedford ....1935 Chestnut St.
Locust 8074
Woolmington, Clarence H.
1600 Arch St.
Rittenhouse 1864 Race 1935
Wooters, William H.
816 W. Allegheny Ave.
Tioga 3283
Wunder, Clarence E. ....1520 Locust St.
Pennypacker 3200
Wurster, Frederick J. ....1530 Locust St.
Pennypacker 7850
Yardley, Ernest Howard
1935 Chestnut St.
Locust 8696
Yeo, Edwin A. .....Bonbright Bldg.
Pennypacker 2467
Young, John .....131 N. 15th St.
Locust 7859
Zantzinger, Borie & Medary ..Otis Bldg.
Rittenhouse 7566
Zantzinger, C. C. .....Otis Bldg.
Rittenhouse 7566
Ziegler, Carl A. .....1012 Walnut St.
Pennypacker 8697 Main 5355
Ziegler, Herbert O. .....Drexel Bldg.
Lombard 5558

ARCHITECTS—LANDSCAPE ARCHITECTS

Morse & Morse .....1524 Chestnut St.
Rittenhouse 5539 Race 5522

ARCHITECTS' SUPPLIES

Defiance Sales Corporation
1214 Arch St.
Spruce 8842
Dietzgen Eugene Company
1521 Sansom St.
Rittenhouse 9020 Race 5529

ARCHITECTURAL BRONZE

(See Bronze—Architectural Bronze)

ARCHITECTURAL PERSPECTIVES

Newman, George A. ..1622 Chestnut St.
Rittenhouse 8149
Sitton, Daniel E. .....721 Walnut St
Walnut 5568

ARCHITECTURAL TERRA COTTA

(See Terra Cotta—Architectural Terra Cotta)

ART GLASS

(See Glass—Art and Stained)

ASH CONVEYORS

(See Conveyors—Ash)

ASH CONVEYOR—PIPE

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

ASH DUMPERS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

ASH EJECTORS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

ASH ELEVATORS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

ASH HANDLING EQUIPMENT

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

ASH HOISTS

(See Hoists—Ash Hoists)

ASH HOPPERS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

ASHES—FOR SALE ASHES

McGurk, Francis P. J.
N. E. Cor. 2d & Columbia Ave.
Regent 3288

ASPHALT

American Insulation Co.
Roberts & Stockley Sts.
Tioga 8700

ASPHALT—Continued

Barber Asphalt Paving Co...1600 Arch St.
Rittenhouse 9000
Bituminous Products Co. ....Perry Bldg.
Rittenhouse 4668
Booth Paving & Construction Co.
4355 Frankford Ave.
Jefferson 7566
Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)
Drehmann Paving & Construction Co.
508 W. Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 44)
Eastern Asphalt Co. .Pennsylvania Bldg.
Locust 5430 Race 6036
Foster Mfg. & Supply Co.
20th & Venango Sts.
Tioga 6290 Park 5551
Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
Bell phone
(See advertisement page 142)
Union Paving Co. ....30th & Locust Sts.
Evergreen 6000
Waring-Underwood Co.
Commercial Trust Bldg.
Rittenhouse 2677
Warren-Ehret Co. ....Erie Ave & E St.
Regent 2480 Park 2333

ASPHALT FLOORING

(See Flooring—Asphalt)

ASPHALT MATERIALS

Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
Bell phone
(See advertisement page 142)

ASPHALT PAVING

(See Paving—Asphalt)

ASPHALT SHINGLES

(See Shingles—Asphalt)

ASH PIT DOORS

(See Doors—Ash Pit Doors)

AUTOMATIC SPRINKLERS

(See Sprinkler Systems—Automatic)

AWNINGS—CANVAS AWNINGS

DeFrehn, Ralph ....3123 Frankford Ave.
Regent 9871 East 8691

AWNINGS—CANVAS AWNINGS—Continued

Goldberg, H., & Son .....733 S. 5th St.
Lombard 2502
Goldberg, J. & Son .....834 S. 5th St.
Lombard 1174 Main 2965
Jones, Wm. L. .....2335 N. 10th St.
Columbia 5543
Landgrebe, Bernard J.
635 Hunting Park Ave.
Michigan 3937
Powers & Co. .....1012 Filbert St.
Walnut 6549
Quay & Co......3020 N. 26th St.
Columbia 2420
Restorff, A. V. .....2626 N. 22d St.
Columbia 8716
Schick, J. F. & Son .....1638 Spencer St.
Waverly 2343
Smith, A. & Son .....1237 Ridge Ave.
Poplar 8676
Sussman, Sam ...3734 Germantown Ave.
Wyoming 0499
Thiel, Max .....832 N. Broad St.
Poplar 1462
Thiel, Walter .....2117 N. 17th St.
Diamond 2934
Vanderherchen, Wm. H.
Emerald St. & Hart Lane
Regent 4480 East 8410
Hoffman Crown Mfg. Co. .312 Market St.
Lombard 0531

AWNINGS & CANVAS SPECIALTIES

R. J. Smith Awning Co. ....138 S. 2d St.
Lombard 1727

BALCONIES—IRON BALCONIES

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

BANK FIXTURES

(See Fixtures—Bank Fixtures)

BANK INTERIORS—HAND WROUGHT ORNAMENTAL IRON

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

BANK PARTITIONS
(See Partitions—Bank)

BANK VAULTS AND DOORS
(See Vaults—Bank Vaults and Doors—Vault Doors)

BAR FIXTURES
(See Fixtures—Bar Fixtures)

BARS—IRON
(See Iron—Bar Iron)

BATHROOM FIXTURES
(See Fixtures—Bathroom)

BATHROOM CABINETS
(See Cabinets—Bathroom)

BATHROOM TILE
(See Tile—Bathroom Tile)

BEAVERBOARD

)odds, Arnold K. .....7044 State Road
Tacony 1256

BEDS—DOOR BEDS
(See Doorbeds)

BELTING—BALATA BELTING

.atimer, Robert L. & Co.
24 N. Front St.
Market 0335 Main 5621

Humphrys, R. A., Sons, Inc.
1021 Callowhill St.
Walnut 6020

BELTING—CANVAS BELTING

atimer, Robert L. & Co.
24 N. Front St.
Market 0335 Main 5621

BELTING—ENDLESS BELTING

ilmer, L. H. Co.
Cottman & Keystone Sts.
Tacony 1626

BELTING—LEATHER BELTING

lexander, E. P. & Son, Inc.
3d & Huntingdon Sts.
Regent 9204 Park 3360

ond Co., Charles .....617 Arch St,
Market 3990 Main 7701

BELTING—LEATHER BELTING—Continued

Brown, D. P. & Co. .....262 N. 4th St.
Market 2726 Main 6775

Etsweiler, William & Co.
335 Green St.
Market 0458

Fifer & Beatty ....Front & Lehigh Ave.
Regent 1676 East 8467

Fisher Leather Belting Co. ..325 N. 3d St.
Market 0156 Main 9087

Himmelein & Bailey, Inc.
246 Chestnut St.
Lombard 6368 Main 7817

Houghton, E. F. & Co. ..240 W. Somerset
Regent 7100

Latimer, Robert L. & Co.
24 N. Front St.
Market 0335 Main 5621

Philadelphia Belting Co.
6th & Spring Garden Sts.
Market 2809 Main 6644

Rhoads, J. E. & Son .....35 N. 6th St.
Lombard 7441 Main 2556

Alexander Brothers, Inc. ....14 South St.
Lombard 3341 Main 7971

Glenn-Ambler Co. ..5018 Beaumont Ave.
Allegheny 6011

BELTING—LINK BELTING

Link Belt Co. .....Hunting Park Ave.
Wyoming 8800 Park 5381

BELTING—RUBBER BELTING

Diamond Rubber Co.
23d & Allegheny Ave.
Tioga 8617 Park 3913

Gilmer, L. H., Co.
Cottman & Keystone Sts.
Tacony 1626

Latimer, Robert L. & Co.
24 N. Front St.
Market 0335 Main 5621

BERLOY PRODUCTS

Steel Lockers
" Concrete Reinforcements
" Floor Joists
" Floor Cases
" Corber Beads
" Channels
Metal Lath
Berger Manufacturing Co.
(Main Office, Canton, Ohio)
16th St. & Washington Ave.
Regent 1443 Race 7495

BINS—CAST IRON BINS

Elliot, Edwin & Co. .....560 N. 16th St.
Poplar 0747
Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7825

BINS—STEEL BINS

Blaw-Knox Co., Inc. ....Widener Bldg.
Rittenhouse 5728
Specialty Engineering Co.
Allegheny & Trenton Aves.
Regent 2785 East 8095
Staley & Morris, Inc. .....214 N. 22d St.
Rittenhouse 5160 Race 1988

BLACKBOARDS—SLATE BLACKBOARDS

Beckley-Cardy Co. .....413 Perry Bldg.
Rittenhouse 8853
Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
Natural Slate Blackboard Co.
Perry Bldg.
Rittenhouse 8166 Race 2714

BLACK PRINTS

Keystone Blue Print Co... 910 Filbert St.
Walnut 4614 Race 7119

BLACKSMITH'S SUPPLIES

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

BLASTING AND ROCK DEMOLISHING

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)
Donohoe, Patrick
4358 Pechin St., Roxborough, Pa.
Roxborough 0211
Scott Supply Co. .....107 Levering St.
Manayunk 0300
Tylar, Harrison R.
452 W. Mount Pleasant Ave.
Chestnut Hill 1393

BLINDS—VENETIAN
(See Venetian Blinds)
Blower Systems

Drieling, G. A., Co.
1716 N. American St.
Columbia 2107
Garden City Fan Co. ..Weightman Bldg.
Rittenhouse 1666
Johnson Fan & Bloker Co. ..The Bourse
Lombard 9300
Lebran Blower Factory ..511 Master St.
Diamond 4320
Murdoch, John P. ....30th & Oxford Sts.
Jackson 4232 Race 2754
Neverfail Sheet Metal Works
2563 Amber St.
Regent 0518 Park 2969

BLOWERS—BLACKSMITH'S BLOWERS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890
(See advertisement page 36)

BLOWERS—COMBUSTION BLOWERS

Drieling, G. A. Co. .1716 N. American St.
Columbia 2107
Garden City Fan Co. ..Weightman Bldg.
Rittenhouse 1666
Murdoch, John P. ...30th & Oxford Sts.
Jackson 4232 Race 2754

BLOWERS—POSITIVE PRESSURE BLOWERS

Lebran Blower Factory ..511 Master St.
Diamond 4320

BLOWERS—VENTILATING BLOWERS

Murdoch, John P. ....30th & Oxford Sts.
Jackson 4232 Race 2754

BLUE PRINTS

Atlas Blue Print Co. .....34 S. 16th St.
Rittenhouse 8894 Race 7632
Barclay Bros. .....1515 Sansom St.
Rittenhouse 9816 Race 7223
Blue Print Co. .....1520 Sansom St.
Rittenhouse 5893 Race 5555

BLUE PRINTS—Continued

Campion & Mayo, Inc. ..1904 Sansom St.
Rittenhouse 4240 Race 1922
General Reproduction Co.
1518 Sansom St.
Rittenhouse 1800
Keystone Blue Paper Co. .910 Filbert St.
Walnut 4614 Race 7719
Philadelphia Blue Print Co. .38 S. 6th St.
Lombard 7046 Main 4263
Quaker City Blue Print Co.
1617 Sansom St.
Rittenhouse 8140 Race 7584
Renninger & Graves ....1311 Sansom St.
Pennypacker 3204 Race 1973
Same .....1237 Filbert St.
Locust 5269 Race 7679
Robbins, Chas. H., Co. ..1729 Sansom St.
Rittenhouse 7530 Race 3519
Campion & Mayo, Inc. ..1904 Sansom St.
Rittenhouse 4240
Paddock & Reeves ..... 26 S. 17th St.
Rittenhouse 7640

BLUE PRINT MACHINES

Barclay Bros. .....1515 Sansom St.
Rittenhouse 9816 Race 7223
Dietzgen, Eugene, Co. ..1521 Sansom St.
Rittenhouse 9020 Race 5529

BLUE PRINT PAPER

(See Paper—Blue Print Paper)

BOILERS—FIRE TUBE BOILERS

Coatesville Boiler Works .Packard Bldg.
Rittenhouse 2017
Lebanon Boiler Works ..Harrison Bldg.
Rittenhouse 4934
Machold & Riddell .Stephen Girard Bldg.
Rittenhouse 2154
Webster, Howard J......Harrison Bldg.
Rittenhouse 1731

BOILERS—GAS FIRED BOILERS

Bryant Heater & Mfg. Co. .1518 Vine St.
Rittenhouse 0916 Race 9533
Comet Radiator Co. .....2010 Market St.
Rittenhouse 7230 Race 2939
Mears-Kane-Ofeldt, Inc.
1903 E. Hagert St.
Regent 6267 East 7439
Richmond Radiator Co.
2220 Chestnut St.
Rittenhouse 8457

BOILERS—GAS FIRED BOILERS FOR HOUSE HEATING

Bartlett & Co. .....1938 Market St.
Rittenhouse 6797 Race 2710

BOILERS—HEATING BOILERS

Bauer, H. C., Co. .....42 E. Allen St.
Market 0119
Burnam Boiler Corp. .....The Bourse
Lombard 9300
Casey-Hedges Co. ....1015 Chestnut St.
Walnut 3068
Coatesville Boiler Works .Packard Bldg.
Rittenhouse 2017
Lebanon Boiler Works ..Harrison Bldg.
Rittenhouse 4934
Pacific Steel Boiler Corp...Widener Bldg.
Rittenhouse 6657 Race 6166
Smith, H. B., Co. ....49th & Grays Ave.
Woodland 9328 West 5211
Webster, Howard J. .....Harrison Bldg.
Rittenhouse 1731

BOILERS—HOT WATER BOILERS

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Molby Boiler Co. .....6245 N. 18th St.
Waverly 2344

BOILERS—RANGE BOILERS

Cummings, Wm., & Co. .2056 Salmon St.
Regent 2222
Penna. Range Boiler Co.
24th & Washington Ave.
Jackson 5180 Race 4184
Thompson, Wm. W., Iron & Steel Co.
6111 Lansdowne Ave.
Belmont 5092

BOILERS—STEAM BOILERS

Seyferts', Son, L. F. .....437 N. 3d St.
Market 0758 Main 4330

BOILERS—STEAM BOILERS—LOW PRESSURE

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
United Utilities & Engineering Corp.
2229 Chestnut St.
Rittenhouse 8457

BOILER COVERING—ASBESTOS BOILER COVERING

Aetna Asbestos Insulation & Roofing Co.
1234 Callowhill St.
Spruce 5830
(See advertisement page 64)
Central Asbestos Co. ....828 N. 4th St.
Market 3078 Park 1465
(See advertisement page 69)
Doud, M. P. .....Widener Building
Rittenhouse 0963
(See advertisement page 69)
Krewson Asbestos Co. ...544 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)
Philadelphia Asbestos Co.
2010 N. 10th St.
Columbia 5434 Park 4065

BOILER COVERING—85% MAGNESIA BOILER COVERING

Carey, Philip, Co. ..24th & Sedgley Ave.
Tioga 8576 Park 5408
(See advertisement page 10)
Livezey, John R.
Glenwood Ave. & W. 22d St.
Diamond 4003 Park 2074

BOILER ERECTING

Boiler Service & Repair Co.
3343 N. Carlisle St.
Tioga 7767 Park 4934

BOILER GRATES

(See Grates—Boiler Grates)

BOILER REPAIRING—GENERAL REPAIRING

Braun, Eugene A. ....6132 Walton Ave.
Granite 0680
Boiler Repairs & Maintenance Co.
Adams Ave. & Leiper St.
Jefferson 2552
Bromhead, Robert C., & Co.
6006 Spruce St.
Sherwood 0538
Burke Boiler Repairing Co.
1821 S. Ringgold St.
Oregon 9026
Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Lomax, J. L., & Co.
6036 Larchwood Ave.
Sherwood 0180 West 2758

BOILER REPAIRING—GENERAL REPAIRING—Continued

McGovern & Smith
4834 N. Leithgow St.
Michigan 3400
Same .....2046 E. Lehigh Ave.
Garfield 2317 East 9061
Philadelphia Boiler Works
1737 Filbert St.
Rittenhouse 3854 Race 2511

BOILER REPAIRS—ELECTRIC WELDING

Electric Welding Process Co.
2327 Pierce St.
Oregon 3786
(See advertisement page 128)
Philadelphia Boiler Works
1737 Filbert St.
Rittenhouse 3854 Race 2511
Standard Electric Welding Co.
1941 E. Sergeant St.
Regent 0240

BOILER SETTING

Ballard Sprague & Co., Inc.
Morris Bldg.
Rittenhouse 9730
Hamilton Construction Co.
1084 Granite St.
Jefferson 2024
Mackenzie, W. P., Co. 1234 Callowhill St.
Spruce 5830
Detrick Co., M. H. .....Morris Bldg.
Rittenhouse 9730
Roe, Howard T. .....7711 Lyons Ave.
Woodland 4893
Wardle, George S.
Harrison and Duffield Sts., Frankford
Jefferson 4926

BOILER TUBES

(See Tubes—Boiler Tubes)

BOILER TUBE CLEANING—COMPRESSED AIR BOILER TUBE CLEANING

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

BOLTS AND NUTS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

BORINGS—TEST BORINGS

(See Drilling—Test Drilling)

BRASS AND BRONZE WORK

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)
Tureau Bros. ..23d & Westmoreland Sts.
Tioga 2302 Park 2141
Penn Brass & Bronze Works
1701 Chestnut St.
Rittenhouse 7183
Wartenby, Harry A. 1823 Brandywine St.
Poplar 8660
Wright Manufacturing Co., Inc.
131 Master St.
Regent 0455 Park 4893

BRASS CASTINGS

(See Castings—Brass)

BRASS GRILLES

(See Grilles—Brass Grilles)

BRASS RAILINGS

(See Railings—Brass Railings)

BRASS TUBES

(See Tubes—Brass Tubes)

BRAZING

Dutton, Rufus L. ..1510 Brandywine St.
Poplar 0291
Electric Welding Service Co.
4100 Paul St.
Jefferson 1056
Hercules Welding & Machine Co.
762 & 766 N. Uber St.
Poplar 3899 Race 5625
Vulcan Brazing & Machine Co.
2126 Race St.
Rittenhouse 1649 Race 7193

BRICK—ACID RESISTANT BRICK

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

BRICK—ARCH BRICK

American Arch Co. .....Bulletin Bldg.
Spruce 8267
Detrick, M. H., Co. .....Morris Bldg.
Rittenhouse 9730
Schlutz, Henry .....3551 N. 6th St.
Tioga 2955

BRICK—COMMON CLAY BRICK

Common Brick Manufacturers' Asso.
121 N. Broad St.
Locust 2282
Arthur B. Murphy, Secretary
(See advertisement page 8)

Association Members

Carroll, H. C. & Son 67th & Gibson Sts.
Woodland 7826
Conway, Willam .....5800 Walnut St.
Granite 0481 West 1831
Keystone Brick Co.
Tabor & Wakeling Sts.
Jefferson 0234
McAvoy Vitrified Brick Co.
Liberty Trust Bldg.
Spruce 1090 Race 5042
Philadelphia Brick Co.—Main Office
25th & Passyunk Ave.
Oregon 0690 Race 6692
Same .....23d & Passayunk Ave.
Regent 1610
Seitter, F., Sons .....Erie Ave. & G St.
Regent 5860 Park 3023
Siner, H. M. & C. B.
Church & Tacony Sts.
Jefferson 6800 East 7785
Same .....Nicetown Lane & K St.
Jefferson 3656
Same .....Oxford & Devereaux Sts.
Jefferson 0148

BRICK—CONCRETE BRICK

Bellfield Concrete Products Co.
Bellfield Ave. & Armstrong Lane
Wyoming 6142
(See advertisement page 185)
Penn Building Block Co. 807 Chestnut St.
Lombard 6791
(See advertisement page 58)

BRICK—CONCRETE BRICK—Continued

Shallcross, J. Burton
5600 Germantown Ave.
Germantown 3040 North 0283
(See advertisement page 146)

Northern Concrete Brick Works
Armstrong St. below Penn St.
Germantown 6784

Collingdale Brick Co. ...1600 Walnut St.
Pennypacker 4867

Peerless Concrete Brick Co.
8343 Bartram Ave.
Woodland 8722

BRICK—ENAMELED BRICK

Hydraulic Press Brick Co. ..Otis Bldg.
Rittenhouse 8650 Race 6052

BRICK—FACE BRICK

Ketcham, O. W. .....121 N. 18th St.
Rittenhouse 7672 Race 6226
(See advertisement page 18)

Cambria Clay Co., Philadelphia
1700 Walnut St.
Pennypacker 2846 Race 0082

Cox, Janeway & Co.
Real Estate Trust Bldg.
Pennypacker 0496 Race 7003

Excelsior Brick & Steel Sales Co.
Bankers Trust Bldg.
Pennypacker 7084 Race 6010

Glen-Gery Shale Brick Co.
Stephen Girard Bldg.
Rittenhouse 6825 Race 9648

Hydraulic Press Brick Co. ..Otis Bldg.
Rittenhouse 8650 Race 6052

Jarden Brick Co. 25th & Passayunk Ave.
Oregon 0647 Race 7173

Pittsburgh Clay Products Co.
2313 Walnut St.
Rittenhouse 3615

Reid, A. S. & Co., Inc. ..1615 Spruce St.
Pennypacker 6631 Park 3053

Shallcross, J. Burton
5600 Germantown Ave.
Germantown 3040 North 0283

Wilkes Barre Clay Products Co.
126 North 18th St.
Rittenhouse 6664 Race 9547

BRICK—FIRE BRICK

Botfield Refractories Co.
776 Swanson St.
Lombard 3488 Main 9122

Cox, Janeway, Co.
Real Estate Trust Bldg.
Pennypacker 0496 Race 7003

BRICK—FIRE BRICK—Continued

Excelsior Brick & Steel Sales Co.
Bankers Trust Bldg.
Pennypacker 7084 Race 6010

Harbison-Walker Refractories Co.
Morris Bldg.
Rittenhouse 0684

Pardee, John S. E.
704 S. Schuylkill Ave.
Locust 5725 Race 5035

BRICK—GLAZED BRICK

Ketcham, O. W. .....121 N. 18th St.
Rittenhouse 7672 Race 6226
(See advertisement page 18)

BRICK—PAVING BRICK

Ketcham, O. W. .....121 N. 18th St.
Rittenhouse 7672 Race 6226
(See advertisement page 18)

BRICK—USED BRICK

Franklin House Wrecking Co.
3301 Germantown Ave.
Tioga 5168 Park 3834

Jump House Wrecking Co.
43d & Woodland Ave.
Woodland 5510 West 2977

Klinges, George & Co., Inc.
3315 Fairmount Ave.
Evergreen 5832 West 1481

Pantano House Wrecking Co.
1216 S. 24th St.
Oregon 0804 Race 9832

Thompson, L. B. .....706 S. 11th St.
Pennypacker 4485

Sorrentino, Michael ....921 Catharine St.
Pennypacker 0798

BRICK—VITRIFIED BRICK

McAvoy Vitrified Brick Co.
Liberty Trust Bldg.
Spruce 1090

BRICKLAYING CONTRACTORS
(See Contractors—Bricklaying Contractors)

BRICK CLEANING

DeHaven, George ....3152 N. Taylor St.
Tioga 5312

BRICKPOINTING
(See Pointing—Brickpointing)

BRONZE—ARCHITECTURAL BRONZE

Ohnstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)
Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)
Bureau Bros. ..23d & Westmoreland Sts.
Tioga 2302 Park 2141
Penn Brass & Bronze Works
1701 Chestnut St.
Rittenhouse 7183
Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)
Wright Manufacturing Co., Inc.
131 Master St.
Regent 0455 Park 4893

BRONZE CASTINGS
(See Castings—Bronze Casting)

BRONZE—EXTRUDED BRONZE

Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)

BRONZE GRILLES
(See Grilles—Brass and Bronze Grilles)

BRONZE—ORNAMENTAL BRONZE

The Gorham Co. .....1505 Arch St.
Locust 0619
Jewell, The A. J., Co. ....1505 Arch St.
Locust 0619

BRONZE—ORNAMENTAL BRONZE BANK INTERIORS

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

BRONZE—ORNAMENTAL BRONZE —BUILDING ENTRANCES

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

BRONZE TABLETS AND LETTERS

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)
Abele, Charles S. .....221 N. 11th St.
Walnut 5346
Bronze Memorial Tablets Co.
23d & Westmoreland Sts.
Tioga 2302
Curry, Samuel F., Co. .....44 N. 4th St.
Market 0990 Main 6306
Franzen, Joseph H. ....121-123 N. 6th St.
Lombard 9086

BRYANT BOILERS AND HEATERS

Frederick, Traugott & Allen, Inc.
1518 Vine St.
Rittenhouse 0916 Race 9533
(See advertisement page 74)

BUCKET LOADERS

Barber-Greene Co. .....236 N. 23d St.
Locust 7075

BUCKETS—CLAM SHELL BUCKETS

Blaw-Knox Co., Inc. ..332 Widener Bldg.
Rittenhouse 5728
Service Supply Corp. 20th & Venango Sts.
Tioga 6290 Park 5551

BUCKETS—ELEVATOR BUCKETS

Hendrick Manufacturing Co.
Harrison Bldg.
Rittenhouse 7874

BUILDERS—CONTRACTING BUILDERS

Collins Construction Co. ..1501 Arch St.
Rittenhouse 6742 Race 1300
(See advertisement page 52)
Lotz, William F.
Oxford Bank Bldg., Frankford
Jefferson 5815 East 7730
(See advertisement page 52)
Adams, Kenneth, Jr. ..3252 N. Philip St.
Regent 2096
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150 Race 2731

BUILDERS

Abramson, Morris .....840 Jackson St.
Oregon 8356
Abramson, Morris .....6807 Ditman St.
Mayfair 9155
Achuff, Frank .....1600 N. Front St.
Regent 8944
Adams, George .. ..5905 Chester Ave.
Woodland 7215
Adams, Kenneth, Jr...3252 N. Philip St.
Regent 2096
Alexander, Leo E. .....5336 Newhall St.
Germantown 5082
Allan Construction Co.
1642 W. Hunting Park Ave.
Wyoming 4066
Allan Construction Co.
Rising Sun Ave & Alcott St.
Fox Chase 9990
Allan, Henry ..1642 W. Hunting Pk. Ave.
Wyoming 4066
Allen Construction Co.
Palmetto & Van Kirk Sts.
Fox Chase 9999
Altarelli, N. & Co. .....1828 S. 9th St.
Oregon 5314
Alterman, Harry ..2731 W. Somerset St.
Diamond 5147
Alterman, Harry ....11th & Cypress Sts.
Walnut 7244
Altman, Harry J. ....5062 Penway Ave.
Delaware 4423
American Bridge Co. .....Pencoyd
Manyunk 0521
American Bridge Co., fld. ofc.
Broad & Walnut Sts.
Pennypacker 4445
American Bridge Co., fld. ofc.
Greenwich Point
Oregon 9017
Anacleto, Ceccarelli .6042 Elmwood Ave.
Woodland 8793
Anastasi Bros. .....7103 Cherokee St.
Chestnut Hill 3705
Anderson, Harry P. ...1420 Chestnut St.
Rittenhouse 6565
Ansell, Pompey & Jos.
Packer Ave. & Smedley St.
Oregon 10300
Anstine, W. W. .....1509 Foulkrod St.
Jefferson 1476
Arcade Construction Co. ..Finance Bldg.
Rittenhouse 1461 Race 5414
Arey, Wm. E. .....112 N. Broad St.
Rittenhouse 5234
Armstrong, Chas. ....4909 Parkside Ave.
Belmont 10347

BUILDERS—Continued

Armstrong, Geo. B.
Rockwell & N. Cottman Sts.
Fox Chase 9939
Armstrong & Latta Co., fld. ofc.
63d & Walnut Sts.
Allegheny 4838
Armstrong & Latta Co. .1926 Sansom St.
Rittenhouse 1866
Arrow, Boris .....992 N. 7th St.
Market 1467
Atkins, Edward .....249 S. 24th St.
Locust 0686
Austin Co. .....1015 Chestnut St.
Walnut 5094
Babis & Bender Construction Co., Inc.
Shubert Bldg.
Pennypacker 1858 Race 9625
Bader, Daniel S. .....Harrison Bldg.
Rittenhouse 7164
Bahn, Paul .....Fern Rock Trust Bldg.
Waverly 4137
Ballinger, R. C., & Co. ....925 Walnut St.
Pennypacker 0191 Main 1192
Ballinger, R. C., & Co., fld. ofc.
6511 Lincoln Drive
Victor 9792
Bannett, Chas. S. .....1633 S. 59th St.
Woodland 0646
Barclay, White & Co. ..1713 Sansom St.
Rittenhouse 6330
Barnes, A. E., & Co.
2044 E. Clementine St.
Regent 7835
Barnes, A. Earl ..2044 E. Clementine St.
Regent 7835
Barnes Construction Co. ...1828 Arch St.
Rittenhouse 6056
Barnett Co. .....Equitiable Bldg.
Pennypacker 3125
Basford, John F. .....6931 Chester Ave.
Woodland 4144
Bassett, E. M. .....1600 Walnut St.
Pennypacker 4121
Bateman, Edmund A. ...5601 N. 16th St.
Waverly 6092
Bateman, John E. .....5601 N. 16th St.
Waverly 6092
Bateman, John J., & Sons
5601 N. 16th St.
Waverly 6092
Bateman, John J., & Sons
1916 Nedro Ave.
Waverly 9926
Bateman, John J., & Sons
Pulaski Ave. & Manheim St.
Victor 9595
Baton, Henry E., Inc. ..1713 Sansom St.
Rittenhouse 5709

BUILDERS—Continued

Baton, Henry E., Inc., fld. ofc.
Holmesburg Ave. & E. State Rd.
Tacony 2416
Batty, John J. .....Luzerne & N Sts.
Jefferson 6498
Bauer, Henry W. ....7203 Ogontz Ave.
Majestic 2932
Bauer, Irvin H.
Glenview Ave. & W. Godfrey St.
Delaware 2439
Bauer, Walter S. ....7203 Ogontz Ave.
Majestic 0898
Same .....7203 Ogontz Ave.
Majestic 2932
Baumann, Arthur C. ....7015 Grays Ave.
Woodland 0685
Bear, E. R. .....17th & Walnut Sts.
Pennypacker 1901
Beatty, Robert .....2321 E. Fletcher St.
Regent 8127
Beckorman, Harry ...6655 McCallum St.
Victor 7153
Beling-Bush Co. .....Drexel Bldg.
Lombard 6135
Beling, George A. .....Drexel Bldg.
Lombard 6135
Belinsky, Max .....5423 Upland Way
Belmont 2956
Benamy, Construction Co. .716 S. 19th St.
Pennypacker 9891
Bender, J. .....Shubert Bldg.
Pennypacker 1858
Benham, Louis A. .....6345 N. 18th St.
Majestic 3846
Benham, Louis A. .....919 Wagner Ave.
Wyoming 10126
Benjamin, Michael ..5th & Courtland Sts.
Wyoming 10042
Bennett, Conway .....3434 Sansom St.
Evergreen 7842
Bennett-McLaughlin Co.
3434 Sansom St.
Evergreen 7842
Berger, Harry .....2337 N. 31st St.
Columbia 6270
Berlingieri & Brenner .1532 S. Corlies St.
Jackson 4645
Berman, Abram ....Front below Shunk
Jackson 9955
Best, Matthew J. .....5543 Loretta Ave.
Jefferson 9718
Betz Bros. .....6915 Rising Sun Ave.
Fox Chase 2040
Bevilacqua, Pasqualo ....2140 S. 10th St.
Jackson 4360
Biddle, Chas. E. .....730 S. 52d St.
Sherwood 8948

BUILDERS—Continued

Bierling, J., & Son .....3902 Warren St.
Evergreen 4561
Bilotta, John S. .....1523 Tasker St.
Jackson 0142
Biscoe, Warren E. .....3946 Baring St.
Evergreen 3996
Bishop, John H. .....49 N. 61st St.
Granite 9061
Block, Monroe .....1235 N. 10th St.
Stevenson 9167
Boardman, Coe A.
534 E. Cheltenham Ave.
Fox Chase 9964
Bobb, Harry .....3529 Ryan St.
Mayfair 9041
Booker, Louis F. .....5229 Arch St.
Sherwood 7466
Booker, Samuel .....896 Alcott St.
Jefferson 9487
Booth, Chas. S. A. ..4355 Frankford Ave.
Jefferson 7566
Booth, Chas. S. A. ..899 Scattergood St.
Delaware 9547
Booth, Chas. S. A. .....6802 Sprague St.
Victor 9562
Borel, Fredk. C., Jr. ....1212 Summer St.
Spruce 3873
Bornstein, B.
Bellfield Ave. & Wingohocking St.
Wyoming 5557
Borthwick, Ralph C..6511 Woodstock St.
Majestic 2387
Boston, Ira H. .....1713 Sansom St.
Rittenhouse 6330 Race 7726
Bowden Const. Co. ....1607 Summer St.
Rittenhouse 5942
Bowden, Edwin .....1607 Summer St.
Rittenhouse 5942 Race 4026
Bowman, Chas. ..8127 Germantown Ave.
Chestnut Hill 2183
Boylan, A. J. .....5147 Lancaster Ave.
Belmont 0464 West 2161
Boylan, A. J. .....4544 Pulaski Ave.
Wyoming 10172
Brace, W. H. .....911 N. 19th St.
Poplar 1825
Braeunig, Louis, Jr. .....5126 N. 5th St.
Michigan 3524
Braeunig, Louis, Jr. .....Fern E 5th St.
Waverly 9875
Bragin, Louis .....2012 S. 5th St.
Jackson 5807
Branagan, Francis B. J.
National Bank of N. Phila. Bldg.
Michigan 9500

BUILDERS—Continued

Branagan, Francis B. J.
Van Kirk St. & W. Colgate St.
Fox Chase 9988

Branagan, Hamilton J.
Elsinore & Van Kirk Sts.
Fox Chase 9963

Brandolini, Nicholas ....1412 S. 15th St.
Oregon 9602

Brangan, Wm. H. ..Fern Rock Tr. Bldg.
Waverly 4137

Brangan & Bahn ..Fern Rock Tr. Bldg.
Waverly 4137

Brangan & Egolf
17th St. & Bellfield Ave.
Wyoming 9922

Brann & Stuart Co. .....State Rd.
Tacony 1370

Brann & Stuart Co., fld. ofc.
17th St. & Sedgley Ave.
Columbia 3371

Brenner, Myer .....2034 S. 5th St.
Oregon 7908

Brenner, S. S. .....1701 Widener Pl.
Waverly 1198

Bressi, Thos. E. ..12th & Christian Sts.
Pennypacker 1592

Brewer, John D. .....746 S. 18th St.
Oregon 8662

Britsch, Herman ....523 W. Nedro Ave.
Waverly 7160

Britsch, Herman ....4th & Rosemar Sts.
Waverly 9891

Brocklehurst, Harry ..512 W. Norris St.
Columbia 1207 Park 4938

Brooks, John T., Jr. .....995 Sanger St.
Jefferson 9973

Broome, Frederick ....4010 Sansom St.
Evergreen 3402

Brosz, Paul ....2515 W. Huntingdon St.
Columbia 0842 Park 2326

Brosz, Paul .....22d & Venango Sts.
Tioga 9211

Brosz, Paul ..Front St. & Columbia Ave.
Nebraska 7967

Brosz, Paul .....Gtn. & Chelten Aves.
Victor 9558

Brosz, Paul
Wyoming & Rising Sun Aves.
Wyoming 10306

Brown-King Construction Co.
Ridge Ave. & Reading R. R.
Manayunk 0570

Brown, Peter J. .....3064 Tulip St.
Garfield 1345

BUILDERS—Continued

Brown & Caruso .....5800 N. 17th St.
Waverly 9927

Brown & Caruso.4113 E. Roosevelt Blvd.
Delaware 9726

Brown & Caruso ..6548 Lansdowne Ave.
Belmont 10220

Brown & Sons .....4728 Baltimore Ave.
Woodland 5011

Bryan, N. W. .Sanger & Roosevelt Blvd.
Delaware 9571

Bryan, N. W., Co. .....10 S. 18th St.
Rittenhouse 6956 Race 1146

Bryan, Newman W. .....10 S. 18th St.
Rittenhouse 6956

Bryan, Wm. J. .....235 Spruce St.
Lombard 3039

Bubeck, W. D. .....Bustleton Pike
Somerton 8373-W

Buchanan, Frank M.....687 N. Broad St.
Poplar 5414

Buchholtz, Karl .....2001 E. Orleans St.
Garfield 4735

Buckius, Fred T., Jr.
Kensington Ave. & Deal St.
Jefferson 1330

Buffone, Silvio .....1322 S. 9th St.
Oregon 4487-J

Burrell, Horace H. ....206 S. Quince St.
Pennypacker 7650

Burrell, Horace H., & Son
206 S. Quince St.
Pennypacker 7650

Bush, Harold M. .....Drexel Bldg.
Lombard 6135

Bushnell, Wm. L., & Sons
2145 E. Firth St.
Regent 9035

Bushnell & Bliss ..Stephen Girard Bldg.
Rittenhouse 2713

Butler & Orlando .....5747 Vine St.
Sherwood 3662

Bythewood, Samuel H..1709 Christian St.
Jackson 0638

Cameron, W. P., Engineering Co.
Packard Bldg.
Rittenhouse 6396

Campbell, B. J. .....939 Flanders Rd.
Belmont 3809

Campion, Herbert G...42d St. ab Spruce
Baring 8631

Campion, Herbert G. .....Otis Bldg.
Rittenhouse 1789

Canny, E. M. .....61st & Sansom Sts.
Sherwood 2123

Carberry, John F. ....5729 McMahon St.
Germantown 2311

Carberry, Thos. J...6123 N. Lawrence St.
Waverly 7050

BUILDERS—Continued

Cardwell, S. H. .....636 E. Locust Ave.
Victor 6961
Carlson, William J. .....Schaff Bldg.
Rittenhouse 9025
Carr, Charles A. .....3025 Poplar St.
Poplar 7381
Carr, William .....3550 Jasper St.
Jefferson 5043
Carr & Courtenay .....3025 Poplar St.
Poplar 7381
Carroll, Benjamin L. ....Packard Bldg.
Rittenhouse 1366
Carroll, Vincent P. .....Packard Bldg.
Rittenhouse 1366
Carson Bros. .....507 Wellesley Rd.
Chestnut Hill 3275
Carson, George W. ....507 Wellesley Rd.
Chestnut Hill 3275
Carson, W. Holmes ..507 Wellesley Rd.
Chestnut Hill 3275
Caserta, Carmine ....7226 Paschal Ave.
Woodland 5706
Cashman, Allen ....2532 N. Howard St.
Regent 4712
Castor Highland Development Corp.
Castor Rd. & Hartel Ave.
Bustelton 0601
Caulfield, Andrew W.
2058 E. Somerset Ave.
Regent 3337
Cavalieri, F. A. ..1201 Cheltenham Ave.
Delaware 3404
Cavalieri, Leopoldo
1265 Cheltenham Ave.
Jefferson 9694
Centrone, C. G. .....Bailey Bldg.
Pennypacker 4321
Chambersburg Construction Co., fld ofc.
City Line & Lancaster Ave.
Overbrook 6842
Cherry, M. .....137 N. 10th St.
Walnut 5024
Chipin, Max .....5833 N. 16th St.
Majestic 2937
Chipin, Max .....5701 N. 17th St.
Waverly 9980
Chipin, Max .....3122 N. 33d St.
Tioga 7742
Chipin, Max .....7144 N. 20th St.
Majestic 3299
Chipin, Max .....1964 Georgian Rd.
Majestic 3035
Cipriano, Antonio .....2026 S. 16th St.
Oregon 6375
Clark, Charles T.
Sedgley & Germantown Aves.
Tioga 6903

BUILDERS—Continued

Clark, James A. .....450 E. Locust Ave.
Victor 9544
Clasby, John T. ....D & Courtland Sts.
Wyoming 9721
Clayton, George P. ....1817 N. 20th St.
Stevenson 4231
Clayton, I. Rightley ....3218 Ridge Ave.
Columbia 7429
Clayton & Davison 217 W. Lippincott St.
Regent 3284
Clemmer, Solomon .....Schaff Bldg.
Rittenhouse 3590
Cloak, William A. ..2004 E. Orleans St.
Regent 4190
Clyman, Harry .....2407 S. Marshall St.
Oregon 2453
Cochran, William W.
2046 N. Van Pelt St.
Poplar 8894
Cockerill, Thomas M. ..6013 Buist Ave.
Woodland 10296
Cockerill, Thomas M.
2242 St. James Terrace
Woodland 7314
Cody Construction Co., Inc.
4627 Frankford Ave.
Delaware 1748
Cody Construction Co., Inc.
8500 Frankford Ave.
Mayfair 3093
Cody Construction Co., Inc., fld. ofc.
Ridge and Roxborough Aves.
Manayunk 1548
Cody Construction Co., Inc., fld. ofc.
141 Grape St.
Manayunk 2119
Cody, John S., Jr. ..4627 Frankford Ave.
Delaware 1748
Cohen, L. M.....1704 Conlyn Ave.
Waverly 3053
Cole, William ....2720 W. Lehigh Ave.
Columbia 4941
Collier, William K. ....2002 N. 29th St.
Columbia 6145
Collins, Joseph P. .....5632 Walnut St.
Granite 2716
Colins, W. J. .....Penn & Anchor Sts.
Jefferson 9222
Collyer, William K. ....2002 N. 29th St.
Columbia 6145
Concrete Construction Co.
1772 N. Bodine St.
Columbia 8545
Condon, John .....17th & Walnut Sts.
Pennypacker 1901 Race 6786
Condon & Co. .....17th & Walnut Sts.
Pennypacker 1901 Race 6786

BUILDERS—Continued

Connen Construction Co.
2315 Walnut St.
Rittenhouse 1991
Conner & Phillips ....3447 Tudor Ave.
Mayfair 9147
Connor, John B. .....4105 Comly St.
Jefferson 9425
Conway, Herbert H. ..5800 Walnut St.
Sherwood 3267
Conway, Michael, Sons
Fayette Ave. & Limekiln Pike
Majestic 4092
Cooper, W. R. .....1600 Walnut St.
Pennypacker 4121
Cooper, William ....Alcott & Saul Sts.
Jefferson 9558
Cornell, J. S. & Son ....1528 Cherry St.
Rittenhouse 3157
Cornell, Wilbert C. .....15 S. 21st St.
Rittenhouse 7959
Corriston, W. D. .....1515 N. 53d St.
Belmont 0975
Cotter & Co. .....1413 N. 16th St.
Stevenson 7008
Courtenay, William H. ..3025 Poplar St.
Poplar 7381
Cowan, Alexander, Sr.
1500 N. Frazier St.
Belmont 3053
Cowperthwait, John H. ..1125 Brown St.
Poplar 1880
Cramp & Co. .....Denckla Bldg.
Walnut 0186
Cramp & Co. .....York & Tabor Rds.
Wyoming 10481
Cramp & Co., fld. ofc. York & Tabor Rds.
Wyoming 5381
Crawford, Daniel .....3900 Chestnut St.
Evergreen 6494
Same .....3901 Chestnut St.
Evergreen 6494
Crawford, Daniel ....5406 Wyndale Ave.
Belmont 9853
Crawford Homes, Inc. 3900 Chestnut St.
Evergreen 6494
Same .....3901 Chestnut St.
Evergreen 6494
Crecelius, William, Jr.....1308 Castle St.
Oregon 9199
Crosby, Joseph G. .....140 N. 11th St.
Walnut 4880
Crouthamel, John F. ..1543 Belfield Ave.
Michigan 3650
Crowhurst, Ernest H. ....Lincoln Bldg.
Rittenhouse 1295
Cunningham & Wurzer
2555 Carpenter St.
Jackson 3351

BUILDERS—Continued

Curtis Co. .....10 S. 18th St.
Rittenhouse 2885
Curtis-Grindrod Co., 32d & Clearfield Sts.
Victor 9512
Cuthbertson, Elmer L.
334 Roxborough Ave.
Roxborough 1145
Cutler, Joseph .....518 Widener Bldg.
Waverly 9823
Cutler, Joseph ....6416 N. Sydenham St.
Majestic 3806
Cutler, Louis .....2846 Diamond St.
Columbia 6298
Cylinder, Michael
3329 W. Allegheny Ave.
Tioga 6661
Dading, Charles H. ....7310 Rural Lane
Chestnut Hill 4586
Dagit Bros. .....1329 Race St.
Rittenhouse 7989
Daniels, J. Morris .....320 S. Quince St.
Pennypacker 0866
Dardis, James .....4438 Leiper St.
Jefferson 8399
Dardis & Lavery .....4438 Leiper St.
Jefferson 8399
Datesman, Frank R. .5583 Old York Rd.
Waverly 8600
Datesman & Parker
7000 Cedar Park Ave.
Majestic 2384
Davenport, Edgar M. .....604 Alcott
Fox Chase 2894
Davenport, William B & Son
638 E. Vankirk St.
Fox Chase 9920
Davidson, Louis ..North American Bldg.
Pennypacker 6383
Davis, Charles J. .....917 N. 19th St.
Poplar 7757
Davis, Charles R. & Son, 5th & 65th Aves.
Majestic 3845
Davis, Charles R. & Son
4729 Ludlow St.
Allegheny 2441
Davis, Earl K .....530 Vernon Rd.
Germantown 4292
Davis, Edward E...16 W. Shawmont Ave.
Roxborough 2623
Davis, Eugene S. .....530 Vernon Rd.
Germantown 4292
Davis, F. B. & Son, Inc... 240 N. 16th St.
Rittenhouse 1675
Davis, Joseph F. W. ....4729 Ludlow St.
Allegheny 2441
Deaveshall Co., Inc... Land Title Bldg.
Rittenhouse 8194

BUILDERS—Continued

eitrich, Frederick W.
Frankford Ave. & Devereaux St.
Jefferson 8112
eitrich, Lewis & Co. ..5921 Walker St.
Jefferson 6889
ektor, A. .....133 S. 12th St.
Pennypacker 2683
eMase, Frank & Sons ..2027 S. 9th St.
Oregon 7392
eVos, Kenneth M. & Co.
Alden Park Manor
Germantown 2388
iDomenico, Paul ....1912 Jackson St.
Oregon 9347
ietrich, George C.
Grant & Frankford Aves.
Torresdale 7073
illman, Fred M.....212 W. Nedro Ave.
Waverly 1791
inerman, Herman
4121 E. Roosevelt Blvd.
Jefferson 9779
iPolvery, Camillo .....347 N. 64th St.
Granite 5347
onato, Charles B. .....1438 S. 9th St.
Oregon 4257
onato, Frank .....1318 Locust St.
Pennypacker 0198
ool, Wilbur S. .....3007 Mercer St.
Regent 8817
ougherty, George C.
2041 Morayian St.
Locust 1372
ougherty, H. B.
50th St. & Wynnefield Ave.
Belmont 2132
ougherty, M. W.....M & Luzerne Sts.
Delaware 9572
ougherty, Matthew W.
3893 Glendale Ave.
Jefferson 9898
ougherty, William R. ..1608 Sansom St.
Rittenhouse 1889
ougherty, William R.
Parkside & Belmont Aves.
Belmont 5771
ownsbrough, H. H. ..Weightman Bldg.
Rittenhouse 7936
oyle, William W. .....878 N. 46th St.
Baring 1354
oyle & Co. .....1519 Sansom St.
Rittenhouse 4728
Same .....15th & Walnut Sts.
Rittenhouse 7656
rake, Harry .....Oxford & Dyre Sts.
Jefferson 0141
rueding & Co. .....5601 N. 16th St.
Waverly 6092

BUILDERS—Continued

Drutt, M. E. ....Franklin & Nedro Ave.
Waverly 9920
Dudnick, Benjamin J. ..1700 Walnut St.
Pennypacker 6997
Dunkelberger, Irvin A.
71 E. Herman St.
Germantown 4112
Durell, E. Clifford
Longshore & Torresdale Aves.
Mayfair 9052
Duva, Joseph A. .....6710 Ridge Ave.
Roxborough 2459
Earl-Thompson Co., Inc.
Bankers Trust Bldg.
Pennypacker 0181
Earl-Thompson Co., Inc.
Equitable Bldg.
Pennypacker 6686
Eddleman, William H. & Son
453 Green Lane
Roxborough 1113
Edel, George
Large St. & Roosevelt Blvd.
Jefferson 9688
Edelban, J. Joseph ....1137 N. Front St.
Regent 4580 Park 4135
Edward Construction Co. ..Drexel Bldg.
Lombard 6747
Egrich, Charles .....677 N. 15th St.
Poplar 5687
Ehmann, John ..21st St. & Snyder Ave.
Oregon 4589
Elgart, Samuel .....4421 Pine St.
Evergreen 5074
Elgart, Samuel .....4504 Pine St.
Sherwood 9806
Elgart, Samuel .....4529 Spruce St.
Baring 9392
Elkins, Harry .....834 N. Holly St.
Evergreen 5000
Ellis, Peter & A. J., Inc.
4th St. bel Wyoming Ave.
Michigan 9779
Elvidge, Frederick & Son
5409 Germantown Ave.
Germantown 3895 North 0267
Emery, John W. .....34 S. 16th St.
Rittenhouse 8391
Emery, John W., Co. .....34 S. 16th St.
Rittenhouse 8391
English, Frank G. & Son
1606 N. Carlisle St.
Stevenson 0822 Park 3028
English, G. H. ..Greene & Chelten Ave.
Germantown 3444
Epp, Robert E. .....110 N. 61st St.
Granite 2417

BUILDERS—Continued

Epstein, Nathan M. ..N. Lycoming Ave. Delaware 9593
Epstein, Nathan Rising Sun Ave. & Sentner St. Fox Chase 2899
Erbe, John R. .....2551 N. 6th St. Regent 1368
Ernotte, Julius .....6142 Market St. Sherwood 2197
Erny, Charles G. ....2d & Rosemar Sts. Majestic 2544
Erny, Charles G. main ofc. Broad & Rockland Sts. Wyoming 3350
Erny, Robert .....4718 N. 4th St. Wyoming 4221
Erwin, Elmer G. ..1635 N. Sydenham St. Stevenson 7770
Erwin, Wm. J. ....5927 Kinsessing Ave. Woodland 3618
Evans, Chas. H. .....2217 Chestnut St. Rittenhouse 9935 Race 7512
Evans, D. Z. .....1416 Vine St. Rittenhouse 1523 Race 1994
Evans, George H. .....1416 Vine St. Rittenhouse 1523 Race 1994
Evans, Geo. H., Inc. Primrose Rd. & Ditman Ave. Torresdale 7167
Evans, Geo. H., Inc. .....1416 Vine St. Rittenhouse 1523 Race 1994
Evans, Henry G. ..1417 N. Warnock St. Stevenson 0529
Evans-Steele, Inc. ....2217 Chestnut St. Rittenhouse 9935
Evitts, Walter A. ..4920 Fairmount Ave. Belmont 3165
Eynon, D. Lloyd .....7203 Ogontz Ave. Majestic 2932
Eyre, Harry H. ..1212 N. Delaware Ave. Regent 8388
Falcone, Chas. J., & Co. .2109 Morris St. Jackson 3150
Farbstein, Joseph .....908 Walnut St. Walnut 1042
Farrell-Roth Const. Co. ....21 S. 46th St. Granite 7881
Faulkner, Floyd R., Co. ..2112 N. 29th St. Columbia 6049
Faust, Jacob M. .....4611 N. Broad St. Wyoming 2313
Fay, The Builder .....5512 Vine St. Sherwood 7971
Feeney, John F. .....106 Kalos St. Manayunk 0164
Feldman, Sander S...5416 Haverford Ave. Allegheny 4202

BUILDERS—Continued

Ferguson, John H......4922 Cedar Ave. Sherwood 1211
Ferguson, Wm., & Son ....405 S. 21st St. Locust 1895
Ferguson & McDowell ..1003 S. 51st St. Woodland 10331
Ferry, Geo. C. .....5955 Osage Ave. Sherwood 1767
Fetter, T. S. .....3312 Lancaster Ave. Evergreen 9667
Figenshu, W. L. .....220 N. 13th St. Locust 3370
Finkelstein, Chas. ..4830 Summerdale St. Jefferson 9920
Fischers, W., Sons, Inc. Broad St. & York Road Waverly 7274
Fish-Rutherford, Inc. ..4058 Chestnut St. Evergreen 0778
Fisher, Harry D. .....Otis Bldg. Rittenhouse 4681
Fisher & Eskin .....6262 Brous St. Jefferson 9281
Fisher & Houseworth ..4231 Neilson St. Jefferson 9276
Fishman, Fort & Park Rorer St. N. Wyoming Ave. Wyoming 10411
Fitt, Frank H. .....5753 N. 5th St. Waverly 0569
Flanagan, Thos. L. ...531 E. Girard Ave. Regent 2527
Fleisher, J., & Sons ..739 Roosevelt Blvd. Michigan 5314
Fogarty, Owen ....3925 Haverford Ave. Evergreen 2864
Foley, John J. .....5908 Augusta St. Jefferson 9431
Forbes, Hugh C. .....47th & Pine Sts. Granite 9660
Forman & Ludwig .....935 Bridge St. Delaware 9517
Foster, Joseph E. ..4938 N. Smedley St. Wyoming 5587
Foulkrod, Fredk. S. .....Schaff Bldg. Rittenhouse 3130
France, John W. .....2218 S. 67th St. Woodland 8744
France, W. M., Sons, Inc. 1214 Sanger St. Jefferson 7744
France & Missar .....2218 S. 67th St. Woodland 8744
France & Missar, Inc., ofc. 6725 Yocum St. Woodland 0215
If no answer call Woodland 8744

BUILDERS—Continued

Francis, Richard S. .....Morris Bldg.
Rittenhouse 3226
Franz, Valentine L. .....5904 N. 4th St.
Majestic 3029
Freas, Walter .....9532 Bustleton Ave.
Bustleton 8262
Freiling, Wm. .....5025 N. 6th St.
Michigan 4564
Frick, Raymond G. .....7312 Briar Rd.
Majestic 3658
Friedman, Huey
Bleigh St. & Castor Rd.
Bustleton 8183
Fruchtbaum & McGrath ..5122 Mebus St.
Jefferson 9441
Fuller, Geo. A., Co..Juniper & Filbert Sts.
Locust 6620
Fuller, Geo. A., Co. .....Morris Bldg.
Rittenhouse 3226
Gaertner, Jacob .....8315 Pine Rd.
Fox Chase 1135
Gale, Charles W. .....Luzerne & N Sts.
Jefferson 6498
Gale & Witty, Inc. ....Luzerne & N Sts.
Delaware 9507
Gale & Witty, Inc. ....Luzerne & N Sts.
Jefferson 6498
Gallagher, Jos. P. ....321 Glen Echo Rd.
Chestnut Hill 4235
Gamber, Branson V...3448 N. Carlisle St.
Tioga 4325
Gatineau Co. .....1700 Walnut St.
Pennypacker 6997
Gaulbert & Young .....2737 Moore St.
Jackson 1855
Geiger & Son .....4657 James St.
Jefferson 4748
Gelman, S. ....F St. & Roosevelt Blvd.
Jefferson 9518
Gelsman, Harry J.
Sanger St. & Summerdale Ave.
Jefferson 9298
General Home Remodeling Co.
2 E. Wister St.
Wyoming 7146
Geslao, P. .....6139 Callowhill St.
Allegheny 8051
Geslao & Beccio ....6139 Callowhill St.
Allegheny 8051
Getzik, Jacob .....504 67th Ave.
Majestic 3613
Gilchrist, Alfred V. .....Drexel Bldg.
Lombard 2647
Gill, Harry, Jr. ...2515 Germantown Ave.
Columbia 5566
Gill, Harry, Jr.
Sedgley Ave. E. Kensington Ave.
Delaware 9521

BUILDERS—Continued

Gill, Harry, Jr., fld. ofc.
Tioga & Richmond Sts.
Garfield 8481
Gill, John N., Construction Co.
Foulkrod & Leiper Sts.
Delaware 9722
Gill, John N., Construction Co.
City Centre Bldg.
Spruce 6644
Same, fld. ofc. .....9th & Walnut Sts.
Pennypacker 5797
Gill, John N., Construction Co., fld. ofc.
9th & Sansom Sts.
Walnut 7874
Gill, John N., Construction Co., fld. ofc.
53d St. & Lancaster Ave.
Belmont 10350
Gillingham & Hynes ....6651 Dorell St.
Woodland 10375
Gillingham & Hynes ....6540 Dorell St.
Woodland 10596
Gillingham & Hynes
60th St. & Cobbs Creek Blvd.
Woodland 3918
Gillingham & Hynes .2031 S. Redfield St.
Woodland 10408
Gimpel, John .....Academy Rd.
Torresdale 7174
Giorgetti, A. Louis Gilbert
N. Gorgas Lane
Germantown 6748
Glaser, Harry Verree Rd. & Shelmire St.
Fox Chase 0770
Glashofer, Philip .....529 Morris St.
Oregon 2806
Glover, B. W. .....111 E. Gorgas Lane
Germantown 8168
Glover, Barclay W. ....6050 Girard Ave.
Granite 7567
Goldberg, Harry .....5202 Arlington St.
Belmont 4794
Goldberg, Saml. .Rubicam & Collom Sts.
Wyoming 10334
Goldberg, Saml. .....2446 S. 9th St.
Oregon 2897
Golder, Construction Co.
Chew St. W. Warnock St.
Waverly 3040
Golder Construction Co., fld. ofc.
Carlisle & Cherry Sts.
Rittenhouse 6842
Golder Construction Co., fld. ofc.
5230 Chestnut St.
Allegheny 4827
Goldman, Morris ..3232 W. Arlington St.
Diamond 6781
Goldstein-Gellman ...4718 Sheffield Ave.
Mayfair 9160

BUILDERS—Continued

Goldstein, Louis .....3912 Smedley St.
Wyoming 10097
Gollub, Green & Sklar, Inc.
2042 Rittenhouse St.
Majestic 3892
Goodman, L. W. ....5839 N. Howard St.
Waverly 9907
Goodman, Lewis W.
Comly & Mulberry Sts.
Delaware 9747
Gordy Bros. .....110 S. 16th St.
Rittenhouse 9468
Gore, W. S. .....1506 Latimer St.
Pennypacker 6915
Gorman & Frank
Hutchinson St. S. Lindley Ave.
Wyoming 10309
Same ..Hutchinson St. S. Lindley Ave.
Wyoming 5065
Gourley Const. Co..21st St. & Ridge Ave.
Stevenson 3168
Gove, Richard Co. .....1712 Ludlow St.
Rittenhouse 7157
Graham-Chambley Co. ...3649 Filbert St.
Evergreen 4456
Grant, J. Frank. .....1625 N. 13th St.
Stevenson 0518
Grau, H. E., Co. .....2125 Cherry St.
Rittenhouse 9818
Gray, George .....4627 Frankford Ave.
Delaware 1748
Grebe, Melvin H. ...5 E. Highland Ave.
Chestnut Hill 0679
Green, Samuel L. ....47th & Brown Sts.
Baring 8434
Greene, M. A. .....1607 N. 13th St.
Stevenson 7169
Greene, Robert E. ..7430 Torresdale Ave.
Tacony 9027
Gregory & Miller .....536 Hermit Lane
Manayunk 1374
Grigg, Albert .....1518 Walnut St.
Pennypacker 5684
Gross, George E. .....1535 Chestnut St.
Rittenhouse 6994
Gruhler, Wm. J., Co. ....219 E. High St.
Germantown 1170
Gruhler, Wm. L. .....219 E. High St.
Germantown 1170
Guarantee Realty Construction Co.
2524 W. Girard Ave.
Poplar 1214
Hack, Joseph .....4725 Sheldon St.
Roxborough 0156-J
Haibach Contracting Co.
19th St. above Indiana Ave.
Columbia 6269

BUILDERS—Continued

Haibach, George, Inc. ..1261 N. 26th St.
Poplar 2102
Haibach, Philip, Contracting Co.
1261 N. 26th St.
Poplar 2102
Hale Construction Co. .....2901 Hale St.
Jefferson 9264
Hale, Wm. E. .....1516 Summer St.
Rittenhouse 7062
Hall, E. R. .....34 S. 17th St.
Rittenhouse 4818
Hall, E. R., fld. ofc.
Flourtown Road & Gravers Lane
Chestnut Hill 0365
Hall, Frank ....71st St. & Greenway Ave.
Woodland 7198
Hallahan, John P. .....3110 Market St.
Evergreen 4377
Hallahan, John P., Inc. ..3110 Market St.
Evergreen 4377
Hallowell, Chas. T..59th & Carpenter Sts.
Allegheny 2790
Hallowell, Harry R.
59th & Carpenter Sts.
Allegheny 2790
Hamilton Co., ofc.
Greene St. & Chelten Ave.
Germantown 2134
Haney & Hannigan ...6700 Cornelius St.
Victor 9618
Hannigan, Charles ..3479 Friendship St.
Mayfair 9186
Hannigan, Joseph W.
Colgate & Rosalie Sts.
Fox Chase 9953
Hannigan, Joseph W.
Sentner & Reach Sts.
Fox Chase 0637
Harnett, Jas. J. .....1159 Bridge St.
Jefferson 9972
Harris, Franklin M., & Co.
1520 Parrish St.
Poplar 7432
Harris, Franklin M., & Co., Inc., fld. ofc.
9th & Willow Sts.
Market 0825
Harris, Wilton W.....2035 S. 19th St.
Oregon 1841
Harting, John B. .....20 E. Johnson St.
Germantown 1246
Harting, Samuel, & Sons
20 E. Johnson St.
Germantown 1246
Harting, Wesley W. ..20 E. Johnson St.
Germantown 1246
Hartzel, C. S., & Son ....5915 Master St.
Granite 7804

BUILDERS—Continued

Hatzfeld, Edward S. .....1828 N. 16th St.
Stevenson 2134
Havens, Fred A., Co.
Evergreen & Stenton Aves.
Chestnut Hill 4582
Havens, Fred A., & Co. ..845 N. 19th St.
Poplar 5206
Havens, Fred A., & Co., fld. ofc.
5th & Noble Sts.
Market 1108
Havens, Fred A., & Co., fld. ofc.
926 Chestnut St.
Walnut 7320
Haverstick-Borthwick Co. ..Schaff Bldg.
Rittenhouse 8549
Haverstick-Borthwick Co., fld. ofc.
Germantown Ave. & Bethlehem Pike
Chestnut Hill 4580
Hazlett, Hugh, & Son ...1701 N. 20th St.
Stevenson 5670
Hearst & Karbach ....6353 Cherokee St.
Germantown 1064
Heckler, C. J. .....3001 N. Croskey St.
Columbia 8506
Hedden, E. J., Co. .....Finance Bldg.
Rittenhouse 1361
Heidt, Peter, Jr.
Stanwood W. Frontenac Sts.
Bustleton 0672
Heinke, E. J. .....505 Church Road
Majestic 3400
Heisler, W. S. .....2147 N. 19th St.
Diamond 7262
Heist & Doherty .....1216 N. 11th St.
Stevenson 1638
Hemer, Philip .....3701 N. Broad St.
Wyoming 3810
Hemple, J. Walter
Carpenter Lane W. Sherman St.
Victor 9560
Henderson, Allan J.
Washington La. E. Chew St.
Germantown 6859
Herman, Bobb & Pepper.47th & Pine Sts.
Sherwood 9854
Herrmann, P. & G. J.
Rising Sun Ave. & Gale St.
Wyoming 10466
Hershey, John S. ..Stephen Girard Bldg.
Rittenhouse 2767
Herzog, Ralph S. .....10 S. 18th St.
Rittenhouse 5440
Herzog, Ralph S., fld. ofc.
Belmont Ave. & Ford Rd.
Belmont 3303
Hesswin Co. .....2047 Arch St.
Rittenhouse 0878

BUILDERS—Continued

Hesswin Co. .....6701 N. Broad St.
Majestic 3266
Hiller, Wm. .....3628 N. Smedley St.
Wyoming 5059
Hiltebeitel, Daniel K.
1501 W. Hunting Park Ave.
Wyoming 4552 North 0007
Hinkle, John F., Jr.
Torresdale Ave & Solly St.
Mayfair 9048
Hintz, W. G., Jr.
1501 W. Hunting Park Ave.
Wyoming 4552 North 0007
Hirsch, Carl F. .....1718 Cherry St.
Rittenhouse 8815
Hirsch, Carl F. .....12th & Louden Sts.
Wyoming 10073
Hoepfl, John M. .....7438 Bingham St.
Fox Chase 1978
Hoffman, Morris .....4908 Brown St.
Belmont 4155
Hofmaier, Henry ....7342 N. Dorcas St.
Fox Chase 0757
Hofmaier, Henry
Van Kirk & Hegerman Sts.
Jefferson 9449
Hogeland, Joel T. .....1416 Vine St.
Rittenhouse 1523
Holden & Sklar
57th St. & Florence Ave.
Woodland 6954
Holden & Sklar ....69th St. & Dicks Ave.
Woodland 10294
Hollenback, Edwin E., Inc.
1910 N. Marshall St.
Diamond 1278 Park 4813
Holloway, G. Thomas ....523 Ludlow St.
Lombard 8773
Homan, H. John, Co. .18th & Cherry Sts.
Rittenhouse 7590
Homan, H. John, Co.
Westview & Greene Sts.
Victor 6316
Home Builders Co., of Philadelphia
5200 Lancaster Ave.
Belmont 6362
Hood, Frank C. .....1535 Chestnut St.
Rittenhouse 6994 Race 0068
Hood & Gross, Inc. ....1535 Chestnut St.
Rittenhouse 6994 Race 0068
Hoover, F. L., & Sons, Inc.
1023 Cherry St.
Walnut 5180
Hoover, F. L., & Sons, Inc., fld. ofc.
224 S. 3d St.
Lombard 0383

BUILDERS—Continued

Hoover, F. L., & Sons, Inc., fld. ofc. 1508 Walnut St. Pennypacker 7266
Hoover, F. L., & Sons, Inc., fld. ofc. 42d St. & Girard Ave. Belmont 6503
Hoover, J. Benton .....1023 Cherry St. Walnut 5180
Hoover, S. Earle .....1023 Cherry St. Walnut 5180
Hopkins, S. ..40th & Spring Garden Sts. Evergreen 2832
Houseman & McGraw, Inc. Maple & Station Rd. Bustleton 8304
Houseworth, Jos. E. ....2512 N. 27th St. Columbia 6227
Hughes-Foulkrod Co. .....Schaff Bldg. Rittenhouse 3130
Hughes-Foulkrod Co., fld. ofc. 51st St. & Grays Ave. Woodland 8574
Hughes, Joseph .....434 N. Budd St. Baring 0731
Hughes, W. R., Jr. .....Schaff Bldg. Rittenhouse 3130
Hummel, Andrew.2057 E. Allegheny Ave. Garfield 3240
Hunsberger, U. S. .....3711 S. 91st St. Woodland 8074-W
Hunt, Walter G. .....2827 N. 6th St. Tioga 7551
Huxman, Ernest E. ..Witherspoon Bldg. Pennypacker 1273
Independent Realty Co. .....Elrae Bldg. Pennypacker 7996
Independent Realty Co. 5171 Whitaker Ave. Delaware 2443
Integrity Construction Co..858 S. 55th St. Sherwood 0466
Irvin, Harold C. .....3318 Fox St. Tioga 8331
Irwin, H. M. .....1613 Ranstead St. Rittenhouse 8825
Irwin & Leighton ..Broad & Sansom Sts. Pennypacker 5231
Irwin & Leighton ..Broad & Sansom Sts. Pennypacker 7949
Irwin & Leighton .Broad & Sansom Sts. Walnut 7373
Irwin & Leighton ....34th & Spruce Sts. Baring 9684
Jackson, J. Richard, & Bro...Perry Bldg. Locust 0926
Jacobs, Philip .....911 N. 8th St. Market 4744

BUILDERS—Continued

Jamison & Greider .....7868 Devon St. Chestnut Hill 4288
Jarrett, Wm. .....5905 Haverford Ave. Granite 7790
Jastrzembski & Co. .....4512 Pearce St. Jefferson 5660
Johnson, S. W. .....17th & Walnut Sts. Pennypacker 1901
Johnston, C. M. ..Commercial Tr. Bldg. Rittenhouse 2148
Johnston, Chas. S., & Son 6122 Baynton St. Germantown 7932
Johnston, James, Co. .....1606 Swain St. Poplar 7975
Johnston, Wm. W. .....1606 Swain St. Poplar 7975
Jones, Lawrence E. Alden Park Manor Apartments Victor 3940
Jones, W. L. .....2830 S. Marshall St. Jackson 9726
Justice, F. G. ....204 W. Highland Ave. Chestnut Hill 4419
Kaiser, Jacob .....1554 S. Ringgold St. Oregon 7811
Kaiserman, Kevy K. Georges Lane & Euclid Ave. Belmont 10573
Kaplan, Benj. A. ...41st & Chestnut Sts. Evergreen 9300 West 5182
Kaplan, Benj. A. ....1413 Bainbridge St. Oregon 10546
Kaplan & Levicoff ..558 E. Godfrey Ave. Fox Chase 9940
Katz & Kleiman .5038 N. Hutchinson St. Michigan 2955
Kaufman Const. Co. ..I & Venango Sts. Garfield 2066
Kaufman, I. S. .....26 S. 15th St. Rittenhouse 0978
Kearney, John P. .....Bankers Tr. Bldg. Pennypacker 6157
Kearney, John P. ..6731 Haverford Ave. Granite 0632
Keefer, E. H., & Son ...1321 Rodman St. Pennypacker 1090
Keefer, E. H., & Son, fld. ofc. 26 W. Chelten Ave. Victor 9675
Keeley, Thos. M. .4411 Germantown Ave. Wyoming 1035
Kelly, J. J. .....6727 N. Broad St. Waverly 2500
Kelly, J. J. ..Middleton & Limekiln Pike Majestic 1915
Kelly, J. J. .....7036 Ogontz Ave. Majestic 1918

BUILDERS—Continued

Kelly, John B. .....2313 Walnut St.
Rittenhouse 8393 Race 1992
Kelly, P. H., Co., Inc. 7th & Christian Sts.
Lombard 8499
Kelly, P. H., Co., Inc.
Roosevelt Blvd. & Boudinot St.
Wyoming 6130
Kelly, Thos. J. .....2d & Sparks Sts.
Majestic 2618
Kempf, N. J. .....1339 N. Howard St.
Regent 2624
Kenin, Nucom ....Cottman & Leon Sts.
Tacony 9044
Kenin & Shapiro, Inc. ..Land Title Bldg.
Rittenhouse 1557
Kenin & Shapiro, Inc.
6622 N. Cornelius St.
Victor 9684
Kenin & Shapiro, Inc.
Glen Echo Rd. E. McCallum St.
Chestnut Hill 4588
Kenin & Shapiro, Inc.
Wynedale & 56th Sts.
Belmont 10221
Kennedy, Samuel J.
Kensington Ave. & Cumberland St.
Regent 0351 East 7723
Kennedy, Samuel J.
74th & Ogontz Aves.
Majestic 3844
Kennedy, Samuel J., Jr..4065 N. Rorer St.
Wyoming 10035
Ketcham & McQuade ...1029 Brown St.
Poplar 2140
Kettman, Frederick ....5720 N. 12th St.
Waverly 2916
Keystone State Construction Co.
640 N. Broad St.
Poplar 6371
Kiely, Frank & Thomas
D & Eleanor Sts.
Wyoming 10573
Kiely, T. J. & F. ..4th St. & Godfrey Ave.
Majestic 3825
Killough, Robert....32 E. Abington Ave.
Chestnut Hill 3335
Killough, Robt. .Wayne Ave & Duval St.
Germantown 2692
Kincaid, Jas. A. .....6038 Gibson Ave.
Woodland 10573
King Construction Co. ....14 N. 60th St.
Granite 4324
Kinsler, Charles .....4209 Aspen St
Baring 1061
Kirmse, Theodore
6502 Rising Sun Ave.
Fox Chase 1675

BUILDERS—Continued

Kirpich, Abraham S ..3211 W. Oxford St.
Poplar 8974
Kirschner, Michael S.
Vernon Rd. & Milton Ave.
Victor 9858
Kister, H. LeRoy ....1204 Chancellor St.
Pennypacker 1777 Race 1866
Klaus & Baxter
Brill Ave. ab Horrocks St.
Jefferson 9335
Klaus & Baxter .....5359 Large St.
Jefferson 9602
Knox-Landers Co., Inc. ....1132 Vine St.
Walnut 6493 Race 7606
Koch, Abe .....5122 Diamond St.
Belmont 9830
Kohn, Max .....2218 N. Woodstock St.
Columbia 2667
Korman, Hyman .....6800 Oakley St.
Fox Chase 9944
Korman, Jacob .....5020 Rosehill St.
Wyoming 1082
Korman, Jacob .....2900 S. 62d St.
Woodland 10388
Koslovsky, Morris, Realty Co.
5th St. & 67th Ave.
Majestic 3672
Kraemer, John L. ..4819 N. Mascher St.
Wyoming 6569
Krakover, Harry & Son ..837 N. 41st St.
Evergreen 1257
Kreitzburg, E. J., Co. ....1333 Arch St.
Locust 3875
Kuhn & Lowery .....209 Sparks St.
Majestic 3817
Lam, Alfred C. .....1001 Wood St.
Walnut 1552
Lam, Bldg. Co. .....1001 Wood St.
Walnut 1552
Lamb, Robert E. fld. ofc.
1608 E. Torresdale Ave.
Jefferson 9312
Lamb, Robert E., Co. ....841 N. 19th St.
Poplar 3223
Lamb, Robert E., Co. fld. ofc.
Hasbrook Ave., S. Hartel St.
Fox Chase 9986
Lamb, Robert E., Co. fld. ofc.
427 N. 8th St.
Market 3667
Lamkin, Louis .....118 S. Ruby St.
Allegheny 5782
Lance, Arthur M. ....2048 E. Haines St.
Majestic 1178
Land, Charles D.
Marston & Chalmers Sts.
Diamond 7598

BUILDERS—Continued

Lang, Edward J. .....1932 E. Pacific St.
Jefferson 8720
Lange, W. W. Woodstock & Dauphin Sts.
Columbia 6069
Langhorne, William, Co.
E. Montgomery Ave. & Thompson St.
Garfield 2737
Langhorne, William, Co.
E. Montgomery Ave. & Thompson St.
Nebraska 9499
Langhorne, William, Co. 1904 Parrish St.
Poplar 4712
Langhorne, William, Co.
L St. N. Luzerne
Delaware 4062
Langhorne, William, Co. bldg. oprtn.
L St. N. Luzerne
Jefferson 9232
Lank, Robert T. 41st St. & Powelton Ave.
Baring 0773
Larzelere, James S. .Franklin Trust Bldg.
Rittenhouse 5441
Lashner, Albert ..216 W. Duncannon St.
Wyoming 4970
Latta, Thomas L .....1926 Sansom St.
Rittenhouse 1866
Laufer, J. J. .....425 N. 10th St.
Walnut 3682
Lawler, P. J. .....Upper Darby
Allegheny 2780
Leewright, F. Nelson ....426 Seville St.
Roxborough 0888
Leighton, A. O. .....Schaff Bldg.
Locust 4050
Leone, Peter J. ....Washington Sq. Bldg.
Walnut 5670
Lerner, S. .....344 E. Eleanor St.
Wyoming 7648
Levin, Harry fld. ofc.
Cottman & Sackett St.
Mayfair 3117
Levin, S. H. .....Elrae Bldg.
Pennypacker 1228
Levin, S. H. .....2208 N. 51st St.
Belmont 10541
Levin, Samuel D. ..Vernon Rd. E. Boyer
Victor 6913
Levin & Abramson
Clapier & Schuyler Sts.
Wyoming 10542
Levitt, Zise .....622 E. Wyoming Ave.
Wyoming 5921
Lichtenstein, Tucker & Harburg
4850 Rorer St.
Wyoming 10196
Liebman, Barnett
Magnolia & E. Ashmead Sts.
Wyoming 10038

BUILDERS—Continued

Liebrich, William H. ...2840 Ridge Ave.
Diamond 4620
Linker, Benjamin .....110 N. 9th St.
Walnut 5353
Lipkin, Harry A. ....7149 Marsden St.
Mayfair 9146
Litman, Nathan .....45th & Pine Sts.
Baring 8644
Litman, Nathan ....46 St. & Chester Ave.
Woodland 10491
Local Development Co.
22d & Walnut Sts.
Locust 0421
Locust Construction Co.
6th & Locust Sts.
Lombard 5921
Lofland, Clayton Co. ..231 N. Water St.
Market 4584
Lombardi, Jos. ..Richmond & Butler Sts.
Garfield 0713
Lombardi, L. & Bros. ....203 Wister St.
Wyoming 8758
Long, M. A., Co.
Richmond & Elkhardt Sts.
Regent 3895
Lotz, W. F. ..Frankford & Oxford Aves.
Jefferson 5815
Loughran, Edward
16th St. & Grange Ave.
Waverly 8367
Loughran, John J. 16th St. & Grange Ave.
Waverly 8367
Loughran's, John, Sons, Inc.
15th St. & Grange Ave.
Waverly 9874
Loughran's, John, Sons, Inc.
16th St. & Grange Ave.
Waverly 8367
Same .....16th & Grange Ave.
Majestic 3838
Loughran's, John, Sons, Inc.
1511 Chew St.
Waverly 9960
Loux, J. Y., Inc.
1501 W. Hunting Park Ave.
Wyoming 4552 North 0007
Love, Donald M. ..Juniper & Walnut Sts.
Pennypacker 1508
Love, Donald M., Inc.
Juniper & Walnut Sts.
Pennypacker 1508
Luce, Gardiner .....136 S. 4th St.
Lombard 2000 Main 4367
Lupowitz, Jos. .....3242 N. 17th St.
Tioga 9203
Lutz, David & Co., fld. ofc.
34th & Pine Sts.
Evergreen 7743

BUILDERS—Continued

Lutz, David & Co., Inc.
23d & Chestnut Sts.
Rittenhouse 5172 Race 7001

Lutz, David & Co., Inc.
Bridge & Darrah Sts.
Delaware 9677

Lutz, David & Co., Inc., fld. ofc.
34th & Spruce Sts.
Baring 8543

MacCorkell, James A.
128 W. Fishers Ave.
Wyoming 10546

MacGregor, Albert B. ....1628 Vine St.
Rittenhouse 8045

Machin & Cockerill, Inc.
68 S. Cobbs Creek Blvd.
Woodland 10546

Madway & Madway ..6253 Magnolia Ave.
Victor 7316

Magen, Gussman & Berman
5107 Pennway St.
Jefferson 9787

Maguire, Charles B.
Magnolia Ave. & Queen St.
Wyoming 10555

Maguire, Charles B., Co.
Peoples Bank & Trust Bldg.
Rittenhouse 4655

Mahon, Charles A. ....6117 Vandike St.
Jefferson 9390

Mahon & Coffin .....6701 N. Broad St.
Waverly 6776

Mahon & Coffin Rodney & Eastburn Aves.
Majestic 3827

Malachowski, A.
Wissinoming & Friendship Aves.
Mayfair 2938

Mallo, E. M. ....11th St. & Indiana Ave.
Tioga 4197

Mangiamele, V. .....1646 S. 16th St.
Oregon 8870

Marcellus, J. & Co. ....1231 N. 51st St.
Belmont 3417

Marciano & Vaccaldino ....813 S. 11th St.
Pennypacker 9263

Mark, Adolph .....511 Lombard St.
Lombard 2436

Mark, F. W. Construction Co., Inc.
Commercial Trust Bldg.
Rittenhouse 0941

Mark, F. W., Construction Co., Inc.
48th & Spruce Sts.
Allegheny 4397

Mark, F. W. Construction Co. Inc. fld ofc
Philadelphia General Hospital
Evergreen 1154

BUILDERS—Continued

Mark, F. W. Construction Co. Inc. fld ofc
City Hall Annex
Spruce 7694

Mark, Frank .....80th Ave. & Upsal St.
Majestic 3894

Mark, Marco .....3448 Englewood St.
Mayfair 9029

Mark, Marco .....2911 S. Robinson St.
Woodland 10051

Markle, George R. .....237 N. 52d St.
Allegheny 3007

Marshall, John J. .....980 Anchor St.
Jefferson 9736

Marshall, John J. ....5240 Arlington St.
Belmont 9761

Marshall, Joseph ..2323 S. Marshall St.
Oregon 2348-W

Marshall & Maloney .....8 S. 52d St.
Sherwood 8042

Martin, Alfred E. .....1207 Race St.
Spruce 7315

Matthy, Philip .....2034 N. Hancock St.
Regent 7956

Maurer & Co., Ltd. ....910 N. Front St.
Market 4274

Maxwell, Albert .....7222 Marsden St.
Tacony 9177

May, Geo. .....Rhawn & Palmetto Sts.
Fox Chase 0462

Mayer, Carl .....3447 Brighton St.
Mayfair 9194

Mayer, Carl A. ..1459 Cheltenham Ave.
Jefferson 9896

Mayhew, John .....2633 S. 66th St.
Woodland 2220

Mazer Co. .....324 S. 7th St.
Lombard 8568

Mazer Co. .....5416 Haverford Ave.
Allegheny 4202

Mazer, Marcus ....5416 Haverford Ave.
Allegheny 4202

Mazzola & Marano ..G St. ab Ramona St.
Wyoming 9315

McBride, William M. & Co.
1211 Walnut St.
Pennypacker 3029

McCann, James .....909 N. 19th St.
Poplar 2040

McClatchy, Jno. H. ..69th & Chestnut Sts.
Allegheny 1700

McClatchy, John H.
4604 Conshohocken Ave.
Belmont 9634

McClatchy, John H.
Midvale Ave. & Henry St.
Germantown 9655

BUILDERS—Continued

McClatchy, John H.
Vaux & Coulter Sts.
Victor 9564

McClelland, D. A., Co. ....Drexel Bldg.
Lombard 3777 Main 5984

McClelland, David A. ....Drexel Bldg.
Lombard 3777 Main 5984

McCleman, H. A. & Bro., stables
22d St. & Moyamensing Ave.
Oregon 8942

McCloskey & Co.
Germantown Ave. & City Line
Chestnut Hill 4114

McCloskey & Co., Inc.
1620 W. Thompson Ave.
Stevenson 6110

McCloskey & Co., Inc., fld ofc
Cottman & Loretta Sts.
Jefferson 9270

McCluskey, Parry T. ..3701 N. Broad St.
Wyoming 3810

McCormick, Lenham, Co. ..4447 Main St.
Manayunk 2629

McCracken, George H.
6555 N. Bouvier St.
Majestic 3833

McCraken, George H.
North Philadelphia Bank Bldg.
Wyoming 6505

McCrudden, M. J.
Midvale Ave. & Henry St.
Germantown 9655

McCrudden, M. J.
Real Estate Trust Bldg.
Pennypacker 5857

McCrudden, M. J. ....3430 Queen Ave.
Victor 7126

McCrudden, M. J. .....3320 Tilden St.
Victor 6956

McCrudden, M. J. ..Vaux & Tilden Sts.
Victor 7129

McDevitt, Joseph P.
Byberry & Thorton Rds.
Torresdale 7087

McDevitt, Joseph P. ..2900 Robbins Ave.
Jefferson 9372

McDonnell, John
Summerdale & Brill Aves.
Delaware 9583

McDowell, William
2619 Susquehanna Ave.
Columbia 8749

McElhenney, Alexander ..1230 S. 28th St.
Jackson 1772

McFarland, P. J. & T. P.
2409 E. Allegheny Ave.
Regent 8401

BUILDERS—Continued

McGarvey, John N. .....Lincoln Bldg.
Rittenhouse 1295

McHenry, Myson E. ..7302 Walnut Lane
Majestic 3805

McHugh, Augustine C.
56th & Elmwood Ave.
Woodland 10157

McHugh, James J., Jr. ..2645 S. 64th St.
Woodland 9881

McHugh, James, J., Jr.
65th & Belmar Sts.
Woodland 9864

McKeeman, Samuel H.
City Line & Haverford Rd.
Belmont 7525

McKenna, B. J. ..2643 N. Hutchinson St.
Columbia 7569 Park 2540

Same .....Penn & Church Sts.
Jefferson 9254

McKenna & Little ..45th & Chestnut Sts.
Baring 8646

McKinley Homes, Inc.
Battersby & McKinley Sts.
Delaware 9508

McLaughlin, Daniel J. ..3434 Sansom St.
Evergreen 7842

McMahon, Joseph P. ....888 Anchor St.
Jefferson 9325

McNeill, Construction Co.
15th & Race Sts.
Rittenhouse 4534

McNeill, Laughlin F. ..15th & Race Sts.
Rittenhouse 4534

McShain, John, Inc. ....1713 Sansom St.
Rittenhouse 5877 Race 1598

McWilliams & Meloney
City Line & Haverford Rd.
Belmont 7525

Same .....64th & Malvern Sts.
Overbrook 8435

Same ....66th St. & Morris Park Rd.
Overbrook 10529

Mecke, J. Howard, Jr., ..Packard Bldg.
Rittenhouse 1176

Meingart, Frank M. ....5807 Hazel Ave.
Sherwood 0689

Melnick, Samuel .....959 N. 8th St.
Market 3320

Melody, Michael & Son, Co., Inc.
1322 Race St.
Rittenhouse 8054

Meloney, Joseph A.
City Line & Haverford Rd.
Belmont 7525

Mendenhall, Hayes & Son ..Drexel Bldg.
Lombard 3506

Menke, Harry .....2132 N. 16th St.
Columbia 5982

BUILDERS—Continued

Mercer, S. H. Bailey
7401 Torresdale Ave.
Mayfair 9019
Mercer, S. H. Bailey ....521 W. Ellett St.
Victor 7319
Meriam Homes Corporation
Miriam Rd. & Sanger Ave.
Jefferson 9373
Metz, Carl .....2d & Godfrey Sts.
Majestic 2609
Metzger, Charles S. .....Otis Bldg.
Rittenhouse 4681
Metzger, Fisher & White ....Otis Bldg.
Rittenhouse 4681
Meyers, Harry .....4504 Pine St.
Sherwood 9806
Middleton, Harry B. ..3405 Disston Ave.
Mayfair 2646
Mignatti, August ..Malta N. Van Kirk St.
Fox Chase 9954
Mignatti, August
Van Kirk below Shisler St.
Jefferson 9472
Mignatti, August ....1109 Overington St.
Jefferson 9798
Mignone, Anthony & Sons Co.
Knight Rd. bel. Byberry Rd.
Torresdale 7176
Miller, C. Edgar, Jr. ..4751 N. Camac St.
Wyoming 1422
Miller, Edward B. ..3935 N. Marshall St.
Michigan 8645
Miller, Edward J. .....168 Cotton St.
Manayunk 2056
Miller, Harold E. .....2528 Coral St.
Regent 0573
Miller, John G. T. ....3136 N. Taylor St.
Tioga 5964
Miller, William F. .....2620 S. 17th St.
Jackson 3474
Mills, Charles P .....8045 Ferndale St.
Fox Chase 9987
Mitchell Bros. .....2125 Race St.
Rittenhouse 4603 Race 6062
Mitchell, James N. 4 S. Farragut Terrace
Granite 0131
Mitchell, James N.
1019 E. Rittenhouse Square
Victor 7387
Mitchell, James N. ..337 E. Sharpnack St.
Victor 7213
Moffly, John W., 3d
Germantown Ave. & Bethlehem Pike
Chestnut Hill 2797
Mohr, R. Melvin .....3701 N. Broad St.
Wyoming 6319

BUILDERS—Continued

Mohr, R. Melvin
Vernon Rd. W. Boyer St.
Victor 9867
Moister, M. & Co.
Hunting Park Ave. & American St.
Wyoming 4833
Monaghan, Thomas B. ..2009 Sansom St.
Locust 1343
Monaghan & Losse ....3016 Chestnut St.
Evergreen 1506
Morris, John .....2231 Columbia Ave.
Stevenson 5274
Morris, W. V. .....711 S. 52d St.
Sherwood 4107
Morrison, Harold S. ..515 W. Erie Ave.
Tioga 2274
Morrison & Gitman ....3446 Aldine Ave.
Mayfair 9046
Morrow, John ...8624 Germantown Ave.
Chestnut Hill 1374
Morrow, John W.
Chestnut Hill Ave. N. Towanda Ave.
Chestnut Hill 4576
Morse, M. H. .....1834 Ellsworth St.
Oregon 7334
Mortimer, John ..Large St. ab Sanger St.
Delaware 9568
Moss, J. Franklin & Co.
6225 Lancaster Ave.
Belmont 6295
Same .....6600 Woodcrest Ave.
Belmont 10462
Moss, J. Franklin & Co. 628 E. Nippon St.
Chestnut Hill 3915
Moss, Ralph F. .....6225 Lancaster Ave.
Belmont 6295
Moss, Warren .....6225 Lancaster Ave.
Belmont 6295
Moyer, Harry R. .....954 Sanger St.
Jefferson 9508
Mueller, Harold P. ..17th St. & 65th Ave.
Majestic 4005
Mulholland & Gotwals 5748 N. Front St.
Waverly 9064
Municipal Construction Co., Inc.
Washington Square Bldg.
Walnut 5670
Murphy, James J. & Son
324 N. Sloan St.
Evergreen 3580
Murphy, James T. .....1640 N. 2d St.
Regent 5757
Murphy, Quigley Co.
Grape & Terrace Sts.
Manayunk 9195
Murphy, Quigley & Co.
1518 Sansom St.
Rittenhouse 4732

BUILDERS—Continued

Murphy, Quigley & Co.
28th & Diamond Sts.
Columbia 9224
Murphy, Wynne A. ....1518 Sansom St.
Rittenhouse 4732 Race 9737
Muth, W. J. .....14 N. 60th St.
Granite 4324
Myers, Jacob, Sons Co.
34th & Spruce Sts.
Baring 8651
Myers, Jacob, Sons Co.
51st St. & Lancaster Ave.
Belmont 7337
Myers, Jacob, Sons Co.
37th & Hamilton Walk
Evergreen 7436
Myers, Thomas J. .....2217 N. 16th St.
Diamond 4308
Myers & Co. .....2217 N. 16th St.
Diamond 4308
Nahm, George A., Inc.
865 Windsor Square
Poplar 0598
Nardizzi, Quirino ....6305 Chester Ave.
Woodland 2609
Nasife, Sidney .....3727 York Rd.
Michigan 5349
Nasife, Sidney .....1429 N. 15th St.
Columbia 8967
Nassau Construction Co.
Torresdale Ave & Levick St.
Mayfair 9004
National Construction Co.
323 N. 64th St.
Granite 8617
Neff, R. W. ....6610 Germantown Ave.
Germantown 2208
Negin, Isidor .....1809 S. 4th St.
Oregon 4206
Negin & Klyman .....1809 S. 4th St.
Oregon 4206
Negro Bros. .....2130 W. Cambria St.
Columbia 2687
Neiman Construction Co.
3301 Germantown Ave.
Tioga 5168
Nelson-Pedley Construction Co., Inc.
Broad St. & Grange Ave.
Waverly 1690
Nelson-Pedley Construction Co., Inc.
1512 Chestnut St.
Rittenhouse 8839
Nemerovsky, Alexander ..1906 S. 4th St.
Oregon 3250
Newberry, William F., Co. 112 S. 16th St.
Rittenhouse 3133
Newell, Martin P. .....1532 Alcott St.
Delaware 9744

BUILDERS—Continued

Niehenke, John J. .....1620 N. 18 St.
Stevenson 8380
Oak Lane Manor Corporation ..City Line
Majestic 2409
Oberholtzer, M. S. ....5524 Pulaski Ave.
Germantown 4394
O'Dea, D. W. .....Opal & Medary Ave.
Waverly 1860
Olhausen & Dillin .....5220 Rexford Rd.
Belmont 9961
Olivieri, Anthony .....890 Marcella St.
Jefferson 9305
Olivieri, Anthony ....1531 Orthodox St.
Delaware 2929 East 7977
Olivieri, Gennaro
Sanger & Summerdale Aves.
Jefferson 9253
Olmi, August .....7th & Johnson Sts.
Oregon 10024
Osborne, George R. .....5014 Saul St.
Jefferson 1145
Osborne, George R. & Son
1168 Anchor St.
Jefferson 9953
Pace, Charles C. .....Cynwyd
Overbrook 1131
Pace, Charles C.
Ridge Ave & Hermitage St.
Roxborough 9211
Pachman, Carl .....257 S. 58th St.
Sherwood 2864
Pappano, D. J. .....531 Bainbridge St.
Lombard 3788
Park, Frederick S.
17th & Moyamensing Ave.
Oregon 4529
Park, Frederick S. .....3217 N. 33d St.
Tioga 6696
Parker, J. Henry ....5583 Old York Rd.
Waverly 8600
Paul, A. .....5228 Arlington St.
Belmont 10461
Paul, A. .....6548 Beaumont Ave.
Woodland 9823
Paul & Krauss ....6409 Chelwynde Ave.
Woodland 10214
Paxson, H. A. .....6225 Lancaster Ave.
Belmont 3100
Paxson, Harry A. ..6225 Lancaster Ave.
Overbrook 9700
Payne, George F. & Co.
Stock Exchange Bldg.
Rittenhouse 9027
Penn Building Co.
Haines & Ardleigh Sts.
Germantown 9912
Pennock, Joseph E. ....Land Title Bldg.
Rittenhouse 3544

BUILDERS—Continued

Perna, Alex E. & Bro .....6413 Vine St.
Granite 6878
Perna, Alfonso & Son ....752 S. 10th St.
Pennypacker 3237
Perna & De Ritta
Daggett & Callowhill Sts.
Sherwood 9685
Peters, A. .....293 E. Bringhurst St.
Wyoming 6589
Peters, Don .....515 Pelham Rd.
Germantown 3538
Peters, Frank J. .....7057 N. 20th St.
Majestic 2633
Peters, Nicholas ..293 E. Bringhurst St.
Wyoming 6589
Peters, Vitus .....293 E. Bringhurst St.
Wyoming 6589
Peterson, R. M. & Son ..16 Queen Lane
Germantown 6382
Philadelphia Construction Co.
Witherspoon Bldg.
Pennypacker 1273
Philadelphia Construction & Repair Co.
1810 Poplar St.
Poplar 4486
Philadelphia House Remodeling Co.
5931 Spruce St.
Sherwood 0735
Philipp, Louis .....2927 N. 24th St.
Columbia 9032
Piccionetti, Vincent ....1939 Snyder Ave.
Jackson 5197
Pierce, W. Edward, Insurance Co.
North American Bldg.
Rittenhouse 7880
Pierce, W. Edward, fld ofc
54th & Arlington St.
Belmont 9870
Pierce, William H. ..1529 Champlost Ave.
Waverly 6710
Pietrykowski, Stefan ..3414 Richmond St.
Regent 6315
Pilton, William ....5947 Larchwood Ave.
Sherwood 0620
Platt, Charles J. W. .....625 N. 6th St.
Market 6327
Pogach & Neiman ....32d & Tasker Sts.
Oregon 10383
Polito, Domenick
McKean & Norwood Sts.
Jackson 0527
Porter-Gildersleeve Co., Inc
Penrose Ferry
Oregon 8556
Pote, Albert H. .....City Line
Majestic 2409

BUILDERS—Continued

Priestman Glyndon fld ofc
223 Durand St.
Victor 4954
Primax Construction Co. 4445 Sansom St.
Evergreen 2714
Pugh, R. H. .....5601 Berks St.
Belmont 2874
Quate, F. .....544 S. 59th St.
Sherwood 1290
Quigley, Edward .....Drexel Bldg.
Lombard 6747
Quigley, Robert P. .....1518 Sansom St.
Rittenhouse 4732
Rabinowitz, Joseph ..23d & Walnut Sts.
Spruce 1583
Rader, Platt & Linton..7728 Walker St.
Mayfair 9157
Raff, A. Raymond 12th St. & Lehigh Ave.
Columbia 10214
Raff, A. Raymond, Co.
1635 W. Thompson St.
Stevenson 2216 Park 4726
Rafferty, John E. ....4128 N. Broad St.
Michigan 7166
Ramos & Wiggins .....732 S. 51st St.
Granite 3857
Ramos & Wiggins .....732 S. 51st St.
Woodland 2839
Ramsdell, Fred L. .....6914 Market St.
Allegheny 1674
Ramsey, William A.
6042 Cobbs Creek Parkway
Allegheny 2615
Ramsey & Williams
Homestead & Milnor Rds.
Delaware 9592
Rankin & Kellogg fld ofc
10th & Spring Garden Sts.
Poplar 1602
Rankin & Kellogg fld ofc
17th & Chestnut Sts.
Rittenhouse 8569
Rea, J. Harvey .....213 N. 11th St.
Walnut 6742
Rea, Samuel J. & Son
1608 Fairmount Ave.
Poplar 4861
Reese & Co. .....4022 Dexter St.
Manayunk 2101
Regan, Thomas J. ..2406 W. Lehigh Ave.
Columbia 2673
Reilly, John P. .....3402 N. 17th St.
Tioga 4913
Reilly, Thomas ..1616 W. Thompson St.
Stevenson 1050
Reinfeld, Wm. .....5325 Thompson St.
Belmont 3254

BUILDERS—Continued

Renaissance Co. .....2208 Walnut St.
Spruce 4669
Rhawnhurst Construction Co.
7801 Loretta St.
Bustleton 8165
Richardson, Chas. J. .....136 S. 4th St.
Lombard 2000 Main 4367
Richardson & Luce .....136 S. 4th St.
Lombard 2000 Main 4367
Riegel, Michael H. ..337 E. Chelten Ave.
Germantown 3701
Rieger, H. R. .....17 N. 21st St.
Rittenhouse 5567
Riemer, Otto E.
Stonehouse & Jones Lanes
Jackson 5194
Riley, James, & Son
Forrest Ave. N. Johnson St.
Majestic 2369
Riling, Raymond J.
Gorgas Lane E. Gorsten St.
Victor 9668
Rimer, George.....4842 Hawthorn St.
Jefferson 6346
Rinaldi, Pietro .....1146 S. 8th St.
Jackson 1031
Robbins Contracting Co.,
5th & Hunting Park Ave.
Wyoming 5036
Roberts, Edw. G., & Son.6000 Tacony St.
Tacony 1689
Roberts, Jas. G. .....1700 Walnut St.
Pennypacker 4066
Roberts & Roller.....1700 Walnut St.
Pennypacker 4066
Robinson, M. W. ....418 N. Redfield St.
Granite 5205
Robinson, Wilfred .Adams & Arrott Sts.
Jefferson 9292
Robinson, Wilfred.Erdrick & Howell Sts.
Jefferson 9746
Robinson, Wilfred .....5420 Saul St.
Jefferson 9858
Rochelle, N. H.
Mascher St. & Wellens Ave.
Wyoming 4924
Rochlis, Samuel ....3357 Wellington St.
Mayfair 9009
Rodin, Louis .. ..435 Dickinson St.
Oregon 4680-J
Roe, Geo. S. .....7711 Lyons Ave.
Woodland 4893
Roeger, Christian F. ....617 Delancy Pl.
Lombard 2023
Roehm, Herbert .....515 Pelham Rd.
Germantown 3538
Rogers, Collins B. .....Drexel Bldg.
Lombard 3130

BUILDERS—Continued

Rogers, J. S., Co. .....Drexel Bldg.
Lombard 3187
Rogers, J. S., Co. .....1231 N. Broad St.
Poplar 1957
Roller, Frank .....1700 Walnut St.
Pennypacker 4066
Roller & Roller, fld. ofc...2031 Locust St.
Locust 8487
Rosenberg, D. .....2510 S. 8th St.
Oregon 5808
Rosengarten, Louis .....Otis Bldg.
Rittenhouse 8568
Rosenheck, Max .....1616 N. 30th St.
Poplar 0896
Rossetti, John .....6406 Dickson Ave.
Woodland 5660
Rothfeld & Bahm...605 E. Stafford Ave.
Victor 7074
Roth, Geo. S., & Sons
230 E. Graver's La.
Chestnut Hill 0158
Roth, Wm. F., Jr.
Terminal St. & Yeakle Ave.
Chestnut Hill 2672
Roth, William F., Jr. ...200 Yeakle Ave.
Chestnut Hill 2672
Roundy, Melvin F. .....2254 N. 17th St.
Columbia 6440
Rowe, Fred E.
Frankford Ave. & Cottman St.
Mayfair 2436
Rowland Construction Co.,
Cottman & Sackett Sts.
Mayfair 3117
Roydhouse-Arey Co.....112 N. Broad St.
Rittenhouse 5234 Race 6156
Roydhouse, George W...112 N. Broad St.
Rittenhouse 5234 Race 6156
Rubin, Barnett & Jos. .4804 Chester Ave.
Woodland 10537
Rubin, Lewis W. .....7210 Ditman St.
Tacony 9032
Rumpf & Kohlmeyer .....3543 Gtn. Ave.
Tioga 7884
Rush Bros.....4682 Darrah St.
Jefferson 5766 East 8063
Rusk, E. J. .....3550 Sheffield Ave.
Mayfair 9165
Rusk, Edw. R.....6017 Charles St.
Jefferson 9662
Rust, Harry R. ....41 N. Hutchinson St.
Lombard 6877
Rust, Harry R., Inc. .....724 Ludlow St.
Lombard 6877
Ruth, C. D. .....8802 Eastwick Ave.
Woodland 5267-W
Ryder, Wm. J. .....1725 Sansom St.
Rittenhouse 4105

BUILDERS—Continued

abatini, Joseph .....1132 S. 10th St. Oregon 8021
abia, Anthony J. ....7302 Walnut Lane Majestic 3805
afford, L. T., Co. Erdrick St. S. Hartel St. Tacony 9043
agel, Benjamin C. .....Penna Bldg. Rittenhouse 0698
t. John, Percy W. ....2008 Church Lane Germantown 6895
algonick, Harry ....1416 N. Franklin St. Columbia 5010
alvato Gaetano ....2211 W. Toronto St. Columbia 6326
anberg, M. .....2622 S. 9th St. Jackson 0288
anders, Harry .....1234 Marlboro St. Regent 2549
antamarie, P. J. .....2501 N. 12th St. Diamond 3871
arshik, Jacob .....5335 Bellfield Ave. Victor 9824
avar, Philip .....718 Snyder Ave. Jackson 1036
broglia, Frederick ..6042 Elmwood Ave. Woodland 8793
chaefer & Co. .....1600 Arch St. Rittenhouse 5326
chestack, H. .....2524 W. Girard Ave. Poplar 1214
chilling, Frank .....4838 Gransback St. Wyoming 10170
chnabel, John, Inc. .....Abbott Bldg. Locust 4280 Race 7157
chneider, Henry P. ..17th & Tioga Sts. Tioga 9541
chneider, Henry P. 3713 Old York Road Michigan 1741
chneider, Henry P., fld. ofc. 58th St. & Springfield Ave. Woodland 10321
chorn, Jos. W. Robbins Ave. & Shelbourne St. Fox Chase 9993
chreiber, Frederick .....1306 City Line Majestic 1519
chubert, Frederick V. .4458 N. Reese St. Michigan 0533
chwinn, George ....1801 W. Albanus St. Wyoming 9533
chwinn, George .....1511 Conlyn St. Majestic 3848
chuster, John .....3531 York Road Michigan 3144
chwinhart, J. B. .....1713 Sansom St. Rittenhouse 6330 Race 7726

BUILDERS—Continued

Scull, Allen .....644 N. 65th St. Allegheny 2320
Scurci & Macrame .....732 S. 7th St. Walnut 1112
Searles, F. S. .....5142 Thompson St. Belmont 4020
Segal, Louis .....429 Roselyn St. Waverly 9917
Seka, Joseph .....14 Highland Ave. Chestnut Hill 0835
Shafer, A. S. .....4651 Walnut St. Granite 2731
Shandles, H. M. .....617 Pine St. Lombard 7637 Main 7186
Shapiro, B. L. .....76th & Ogontz Aves. Majestic 3897
Shapiro, B. L. .....6433 N. Broad St. Majestic 3091
Shapiro, Max ..58th St. & Lebanon Ave. Belmont 10119
Shapiro & Reed .....5230 Walnut St. Allegheny 6644
Sharten, Albert A...Charles & Tyson Sts. Mayfair 9049
Shatten, Albert A. .....Land Title Bldg. Rittenhouse 6276 Race 0956
Shea Const. Co. .....1905 S. Broad St. Oregon 8609
Shechtman Bros. .....1734 N. 7th St. Diamond 3038
Shechtman Bros. ...1924 N. Marshall St. Columbia 7863
Sheperla Joseph ..Broad & Rockland Sts. Wyoming 4542
Sher, Wm. ...Gravers La. & Gtn. Ave. Chestnut Hill 2792
Sherman, John .....7121 Marsden St. Tacony 9188
Sherman, John Mitchell ..N. Markle St. Roxborough 9141
Shifren, Hyman ..Fkd. & Robbins Aves. Jefferson 9371
Shisler, John W. ....D & Ruscomb Sts. Wyoming 10376
Shisler & Allen .....7131 Gillespie St. Tacony 9173
Shisler & Allen..American & Bristol Sts. Wyoming 10028
Shoemaker, Samuel ..Franklin Tr. Bldg. Rittenhouse 5441 Race 4217
Shubin, David X. .....1700 Walnut St. Pennypacker 6997
Sidewater, Joseph ....1211 Chestnut St. Rittenhouse 2161
Silver, Joseph .....1741 S. Avondale St. Woodland 10365

BUILDERS—Continued

Silver, Joseph S.
Belgrade St. below Westmoreland St.
Nebraska 8608
Silver, Joseph S. .....L & Luzerne Sts.
Delaware 9540
Silver & Saidel .....4002 Rhawn St.
Holmesburg 9191
Simmons, John ..Ins. Co. N. Amer. Bldg.
Rittenhouse 5186
Sinclair & Grigg
Oregon Ave. W. Weccacoe St.
Jackson 6471
Sinclair & Grigg .....1518 Walnut St.
Pennypacker 5684 Race 7671
Sindon & Polito ....6527 Elmwood Ave.
Woodland 9954
Singer, A. ....Ogontz & Pittvale Aves.
Majestic 0197
Singer, A. .....5909 Shisler St.
Jefferson 9560
Singer, Philip .....1636 S. 6th St.
Jackson 4979
Sklar, Jacob, & Sons ....1613 N. 13th St.
Stevenson 7205
Sklar, M. .....628 Pine St.
Lombard 5899
Slass, Harry ..Henry & Roxboro Aves.
Roxborough 9218
Sloan, David .....815 E. Chelten Ave.
Germantown 7299
Same .....404 E. Sharpnack St.
Victor 7223
Sloan, David.Van Kirk & Weymouth Sts.
Fox Chase 2875
Slowik, Andrew .....4353 Pierce St.
Jefferson 4838
Smith, Alan G. .....844 N. Broad St.
Poplar 3039 Park 4406
Smith, Anthony J. .....1221 S. 26th St.
Oregon 5401
Smith, Blenis A. .....14 N. 60th St.
Granite 4324
Smith, Frank J.....331 Lyceum Ave.
Roxborough 1318
Smith Hardican Co. ..1811 Callowhill St.
Rittenhouse 3373
Smith, John H. ....5608 Warrington St.
Woodland 8357
Smith, McGowan & Donnelly
Sanger & Discher Sts.
Jefferson 9235
Smith & Hallstrom
7959 W. Oxford Ave.
Fox Chase 0209
Smith & Schmunk ....800 W. Erie Ave.
Tioga 5574

BUILDERS—Continued

Smith & Schmunk
Hawthorne St. N. Higbee St.
Jefferson 9862
Smith & Vollmer ..1404 E. Lycoming St.
Jefferson 9437
Snare, Fredk., Corp. ...1524 Chestnut St.
Rittenhouse 9520
Snyder, John M., & Son ..1245 Alcott St.
Jefferson 9815
Solomon, J. .....1828 N. Franklin St.
Columbia 3444
Sorensen, M. D. .....1133 Callowhill St.
Walnut 0643
Sorkin, David .....309 S. 40th St.
Baring 9899
Sorkin, David & Son .....
Farragut & Chester Aves.
Woodland 9777
Sosnoffsky, Jacob
3129 W. Montgomery Ave.
Columbia 7181
Spayd, Chas. I. .....7241 Louise St.
Majestic 0805
Sperry, D. W. .....Jefferson Bldg.
Walnut 5023
Spitz, John E. .....6665 Cornelius St.
Victor 7111
Spitzer, Penn, Futton
Haines & Ardleigh Sts.
Germantown 9912
Springer, W. O. .....2004 Naudain St.
Spruce 0435 Race 6121
Stanley Construction Co. ..Lincoln Bldg.
Rittenhouse 4666
Steel, Wm., Sons, Co. 53rd & Hadfield Sts.
Allegheny 2216
Steele, Wm. & Sons Co.
15th & Cherry Sts.
Spruce 0266
Steele, Wm. & Sons Co.
Godfrey W. Rising Sun
Fox Chase 1499
Steele, Wm. & Sons Co. fld. ofc.
C & Westmoreland Sts.
Regent 8418
Steele, Wm. & Sons Co. fld. ofc.
Belmont Ave. & Conshohocken Ave.
Belmont 8523
Stees, Ernest J. .....2236 N. Reese St.
Regent 0610
Steinacker, Otto .....3958 N. 5th St.
Michigan 1394
Steinman & Lesse ....1848 Georges Lane
Belmont 9893
Steinman & Lesse ....3546 Bleigh Ave.
Mayfair 9142
Stern, Harris & Son 2004 N. Marston St.
Columbia 1521

BUILDERS—Continued

Stevens, W. John, Inc. ..1524 Chestnut St.
Rittenhouse 6305
Stewart Bros. .....2526 N. Orkney St.
Regent 3139 Park 4440
Stewart, Frank G.
Evergreen & Ardmore Aves.
Chestnut Hill 4282
Stewart, Frank G. .....1518 Locust St.
Pennypacker 0824
Stofflet, H. M. .....Wesley Bldg.
Rittenhouse 8396 Race 5644
Stofflet & Tillotson
Pulaski Ave. N. Chelten Ave.
Victor 7396 Race 8597
Stofflet & Tillotson .....Wesley Bldg.
Rittenhouse 8396
Stokes Bros. .....6723 Musgrave St.
Germantown 0294
Stone, Harrie E. ..2166 E. Cumberland St.
Regent 4877
Stone, Wm. E. ....2069 E. Dauphin St.
Regent 9676
Stone & Webster, Inc. dist. ofc.
Real Estate Trust Bldg.
Pennypacker 3400
Storch, Frank ....Levick & Ditman Sts.
Mayfair 9047
Storck, Jesse .....7308 N. Sommers Rd.
Majestic 3855
Stoutenburgh, T. A. ....3438 Mervine St.
Tioga 2701
Strock, W. E. .....7940 Oxford Ave.
Fox Chase 1807
Summer Bungalow Corp 917 Chestnut St.
Walnut 3700
Sutter, H. C. .....1706 N. 55th St.
Belmont 4216
Sutton & Stephenson
1317 Washington Ave.
Oregon 0403 Race 6655
Swartley & Son .....6835 Ridge Ave.
Roxborough 1620
Swartley & Struse
Krams & Manayunk Aves.
Manayunk 2590
Talley, James S. ....2014 Chancellor St.
Locust 0682
Taylor, George C. .....1005 Wood St.
Walnut 6824
Terry, J. H. & Co. .....Drexel Bldg.
Lombard 0400
Theriault Con. Co. ..534 E. Johnson St.
Germantown 1862
Thompson, J. P. ..Real Estate Tr. Bldg.
Pennypacker 6066
Thompson-Starrett Co. 15th &Walnut Sts.
Pennypacker 6964

BUILDERS—Continued

Thompson-Starrett Co. main ofc.
Packard Bldg.
Spruce 1960
Thompson-Starrett Co. ..815 Chestnut St.
Walnut 2514
Thompson, Wm. N. ....1920 Cherry St.
Rittenhouse 4867
Tillotson, E. S. .....Wesley Bldg.
Rittenhouse 8396
Tioga Bldg. Construction Co.
3245 Germantown Ave.
Tioga 2338
Tipton & Davis, Inc. 438 E. Phil Ellena St.
Victor 7186
Tomlinson, Geo. & Son ..Presser Bldg.
Rittenhouse 8696
Tomlinson, Howard G. 7203 Ogontz Ave.
Majestic 2932
Tourison, Ashton S. ....7014 Boyer St.
Chestnut Hill 2963
Tourison, Ashton, S., Jr.
520 E. Durham St.
Chestnut Hill 3185
Tourison, Bart Sprague & Meehan Aves.
Victor 9981
Townsend, C. A. .....Schaff Bldg.
Locust 4050
Townsend, Schroeder & Wood, Inc.
Drexel Bldg.
Lombard 1090
Townsend, Schroeder & Wood, Inc.
Allens Lane & Emlen St.
Chestnut Hill 4378
Townsend, Schroeder & Wood, Inc.
1808 E. Hazzard St.
Nebraska 9959
Trafford, Thos. C. .....2339 N. 15th St.
Columbia 5894 Park 2104
Trafford, Thomas C.
Moyamensing Ave. & Morris St.
Jackson 4794
Traub, Aaron ....810 W. Sedgwick St.
Victor 9545
Trent, Joseph F. ....19th & Addison Sts.
Pennypacker 7276 Race 1847
Trexler, Howard..... 212 E. Hortter St.
Germantown 0215
Trio Construction Co. ..212 N. 65th St.
Granite 4604
Troemner, R. Wallace ..508 Sanger Ave.
Fox Chase 2896
Trois, Charles P. .....743 E. Penn St.
Germantown 2614
Truman Construction Co. ..226 S. 15th St.
Pennypacker 9149
Turnbull & Cornell .....15 S. 21st St.
Rittenhouse 7959 Race 3422

BUILDERS—Continued

Turnbull & Cornell .....5614 N. 5th St.
Waverly 9852
Turner Constr. Co. ..47th & Market Sts.
Allegheny 4161
Turner Constr. Co. ..47th & Market Sts.
Granite 9834
Turner Construction Co. fld. ofc.
10th & Spring Garden Sts.
Poplar 1602
Turner Construction Co. fld. ofc.
17th & Chestnut Sts.
Rittenhouse 8569
Turner, J. Archer ....17th & Walnut Sts.
Pennypacker 1901
Turner, Wm. W. ....17th & Walnut Sts.
Pennypacker 1901
Uber, John ..Dorset St. W. Crittenden St.
Victor 9614
Uber, John
Stenton Ave E. Mt. Pleasant Ave.
Chestnut Hill 4083
Uhler, W. G. .... 25th St. & Snyder Ave.
Oregon 8243
Van Asdlen Construction Co., Inc.
Stock Exchange Bldg.
Rittenhouse 6834
Van Asdlen, W. S. Stock Exchange Bldg.
Rittenhouse 6834
Van Loon, F. W. .....Perry Bldg.
Rittenhouse 7341 Race 1184
Vansant, William R.
Bustleton Pike S. Somerton
Somerton 8322-W
Vantine, John R.
Torresdale Ave. & Shelmire St.
Tacony 9021
Vassallo, Jos. .....203 W. Clapier St.
Wyoming 5088-J
Vaughan, George W.
1336 E. Montgomery Ave.
Regent 8385
Vaughan, Henry V., Sons & Co.
1336 E. Montgomery Ave.
Regent 8385
Vogdes, Hamilton .....112 S. 16th St.
Rittenhouse 0746
Waecker, Albert C. ....4133 Lauriston St.
Manayunk 0928
Wagner, Walter ..8017 Frankford Ave.
Holmesburg 1520
Wajdyk, Leon M. ..403 W. Clearfield St.
Regent 1344
Wallace, Frank E ....337 S. Camac St.
Pennypacker 7039 Race 4607
Walnut Constr. Co. ..48th & Wanut Sts.
Allegheny 9615
Walrath, Martin H. & Son Sedgwick Apts.
Victor 9991

BUILDERS—Continued

Walsh, Charles V., Co.
58th St. bel Woodland Ave.
Woodland 5252
Walt, J. E. ..204 E. Willow Grove Ave.
Chestnut Hill 0787
Walter, Jas. H. ....168 E. Walnut Lane
Germantown 2060
Wark Co. .....1600 Walnut St.
Pennypacker 4121 Race 7821
Same .....Broad & Airdrie Sts.
Wyoming 9373
Same ..Hunting Pk. Ave. & Stokley St.
Tioga 5927
Same ..Hunting Pk. Ave. & Stokley St.
Tioga 7832
Wark, W. E. .....1600 Walnut St.
Pennypacker 4121
Warren, F. V., Co. 56th St. & Cedar Ave.
Granite 1294
Warren, F. V., Co. .....1913 Arch St.
Rittenhouse 6107
Warren, Wilbur W. ..1336 McKean St.
Jackson 1052
Warshawsky, A. M. ....814 N. 40th St.
Baring 0161
Warshavsky, David ..812 N. Marshall St.
Market 0218
Watson, George J. ....421 Chestnut St.
Lombard 3440
Weathertite Caulking Co.
3712 N. Sydenham St.
Michigan 6142
Weaver, John T. ..24 W. Phil-Ellena St.
Germantown 3894
Wehmeyer, Harry H. main ofc.
509 W. Cumberland Ave.
Regent 2776
Weild, Charles M. ..58th & Coleman Sts.
Belmont 10589
Weild, Charles M. ..59th & Coleman Sts.
Belmont 5014
Weinrott, Geo. H. ..67th & Malvern Sts.
Belmont 10468
Weinrott, Geo. H. 5792 Haddington Ave.
Belmont 10537
Weinrott, Geo. H. .....4628 Newhall St.
Wyoming 9557
Weinrott, Geo. H. ..5716 W. Oxford St.
Belmont 10569
Weiss Construction Co. ..901 Walnut St.
Pennypacker 3772
Weiss-Koplin Construction Co.
2133 N. 33th St.
Columbia 9001
Weiss-Koplin Construction Co.
Franklin Trust Bldg.
Rittenhouse 8210

BUILDERS—Continued

Veiss, Samuel .....901 Walnut St.
Pennypacker 3772
Verner, H. P. ..3245 Germantown Ave.
Tioga 2338
Verner, H. P. & Co.
3243 Germantown Ave.
Tioga 2338
Vest Philadelphia Construction Co., Inc.
66th St. & Haverford Ave.
Allegheny 3640
Vest Philadelphia Realty & Constr. Co.
541 S. 46th St.
Woodland 10567
Vetherstein, Wm. C. ..286 E. Queen St.
Wyoming 10265
Vetzel, Daniel H. .590 E. Jamestown St.
Roxborough 2220
Vhelan, John M. ....Witherspoon Bldg.
Pennypacker 3443
Vhelan, P. J. & Jas. T. Bankers Tr. Bldg.
Pennypacker 6959
Vhelan, P. J. & Jas. T. 5901 Loretto Ave.
Jefferson 8740
Vhite, Barclay .....1713 Sansom St.
Rittenhouse 6330
Vhite, Barclay & Co. ..1713 Sansom St.
Rittenhouse 6330 Race 7726
Vhite, E. L. .....Otis Bldg.
Rittenhouse 4681
Vhite, Wm. & Son ..1918 Brandywine St.
Poplar 2361
Vhitehead, A. .....2004 Naudain St.
Spruce 0435 Race 6121
Vhiteside, Rush J. & Sons
2115 Wallace St.
Poplar 2302
Vhittaker, H. Roy .. 5th & Roslyn Ave.
Waverly 9862
Vhittaker, H. Roy .....726 Nedro Ave.
Waverly 9822
Vhitty, R. P., Co. .....Schaff Bldg.
Rittenhouse 6928 Race 6665
Same .....20th & Walnut Sts.
Rittenhouse 4631
Same .....20th & Walnut Sts
Locust 6035
Same .....63d St. & Columbia Ave.
Belmont 8332
Same .....63d St. & Columbia Ave.
Belmont 10367
Same Bldg. Opertn 43d & Locust Sts.
Baring 9589
Same .....Greene & Hortter Sts.
Victor 3822
Same .....Greene & Hortter Sts.
Victor 7197
Vhitty, R. P., Co.....43d & Locust Sts.
Baring 7989

BUILDERS—Continued

Whyte, John J. .....Luzerne & N Sts.
Jefferson 6498
Wible Bros. .....1115 Wilt St.
Regent 8637
Wiener, Morris Mascher & Ruscomb Sts.
Wyoming 10425
Wilhofsky, Samuel .....605 Morris St.
Oregon 7803-W
Williams, Contg. Co. ...2620 S. 17th St.
Jackson 3474
Williams, Edwin F. ...5603 Diamond St.
Belmont 0740
Williams, Frank .....701 S. 58th St.
Sherwood 4316
Williams Frank D. ..6608 Ogontz Ave.
Majestic 3590
Williams, Frank & Son ..701 S. 58th St.
Sherwood 4316
Wills, John R. .....601 Locust Ave.
Germantown 6997
Wilson, A. J. .....4013 Ludlow St.
Evergreen 6873
Wilson, Edgar M. ..5156 Haverford Ave.
Sherwood 8067
Wilson, J. Sims & Co. ....1125 Brown St.
Poplar 1880 Park 1141
Wilson, John A., Jr. ....1430 N. 12th St.
Stevenson 1017
Wilson, R. D. & J. M. ....1530 S. 57th St.
Woodland 0829
Wilson & English Construction Co., Inc.
1905 S. Broad St.
Oregon 8609
Wintz Bros. .....1618 Sellers Ave.
Jefferson 0432 East 8792
Wintz, Frank I., Inc., ..1618 N. 27th St.
Stevenson 5200 Park 2241
Wintz, Frank I. .....1618 N. 27th St.
Stevenson 5200 Park 2241
Wolf, Harry .....5201 Berks St.
Belmont 4184
Wollerton, Frank G. .....Drexel Bldg.
Lombard 2647
Woodoth, David F. .....132 N. 3d St.
Market 0958
Woolfall, Jack H. .....5826 Alter St.
Allegheny 7194
Worley, F. K. .....1701 Arch St.
Rittenhouse 2864
Worley, F. K. Construction Co.
1701 Arch St.
Rittenhouse 2864
Wright, Wm. C. & Son ..22 Harvey St.
Germantown 3307 North 0041
Yacknitz & Yaffe .....1641 N. 27th St.
Poplar 4655

BUILDERS—Continued

Yagle, E. C. .....6546 Woodland Ave.
Woodland 1053
Yardley, John M. .....1700 Walnut St.
Pennypacker 6880 Race 1867
Yellin, M. .....712 N. Franklin St.
Market 1110
Yellin, M. S. .....959 N. 8th St.
Market 3320
Yellin S. & Son .....222 N. 11th St.
Walnut 7087 Race 1123
Yonker, W. Earl .....5216 Gainor Rd.
Belmont 9848
Young, Louis R. .....3441 A St.
Garfield 2462-J
Young, Milton W. .....2037 N. 63d St.
Overbrook 0565
Young, Townsend B.
Glendle & Luzerne Sts.
Delaware 9584
Zane, Judson M.
Hampton Ave. E. Germantown Ave.
Chestnut Hill 0369
Zane, Judson M. .....Land Title Bldg.
Rittenhouse 6739
Zannini, Charles .....6239 Vine St.
Sherwood 0462
Zebley, Charles H. S. ....3938 N. 7th St.
Gladstone 0932
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150 Race 2731
Zerbey & Holloway
60th St. & Elmwood Ave.
Woodland 10102
Zerbey & Holloway ....4717 N. Broad St.
Michigan 8110
Zingraf, Herman C. ....6346 Homer St.
Germantown 4779
Zobel, Otto .....2709 S. 63d St.
Woodland 0526
Zoltowski, Konstanti
2737 E. Indiana Ave.
Regent 4855
Zovoloff & Cooper .....4717 Napfle St.
Tacony 9030

BUILDERS—OPERATION BUILDERS

McClatchy, John H.
69th & Chestnut Sts.
Allegheny 1700 West 1753

BUILDERS' COMPRESSED AIR SERVICE

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

BUILDERS' HARDWARE

(See Hardware—Builders')

BUILDERS' IRON WORK

(See Iron Work—Builders' Iron Work)

BUILDING BLOCKS

(See Concrete Blocks)

BUILDING CLEANING

McCann Bros. .....2316 South St.
Locust 8061
Weatherproof Pointing Co.
1133 Callowhill St.
Walnut 0643
Christensen, Adolph .....1433 Brown St.
Poplar 0153
Carlson, John G. .....4013 Wallace St.
Baring 0561

BUILDING CLEANING—COMPRESSED AIR BUILDING CLEANING

Compressed Air Service Corporation
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

BUILDING CONSTRUCTION

Collins Construction Co. ..1501 Arch St.
Rittenhouse 6742 Race 1300
Lotz, Wm. F. ..Oxford Bank Bldg., Fkd.
Jefferson 5815 East 7730
Stevens, W. John, Inc. ....Wyncote, Pa.
Ogontz, 1500 Glenside 88

BUILDING CONSTRUCTION REPORTS

Dodge, F. W. Corp. ...207 N. Broad St.
Locust 4326 Race 5376
Building News Publishing Co.
1530 Chestnut St.
Rittenhouse 9771 Race 7109

BUILDING MATERIAL—BUILDING BLOCKS

Penn Building Block Co., Inc.
807 Chestnut St.
Lombard 6791 Main 8217
(See advertisement page 58)

UILDING MATERIAL—BUILDING BLOCKS—Continued

hila. Partition & Building Block Co.
28th & Ritner Sts.
Jackson 6278 Race 3553
(See advertisement page 60)

hallcross, J. Burton ....5600 Gtn. Ave.
Germantown 3040 North 0283
(See advertisement page 146)

traub Cinder Block Co.
28th & Ritner Sts.
Jackson 6278
(See advertisement page 60)

alsh, Chas. V.
58th St. below Woodland Ave.
Woodland 5252 West 1148

eiss, Philip
Fischers Ave. & Mascher St.
Michigan 2356

UILDING MATERIAL—CRUSHED STONE

avino, E. J., & Co. .....Bullitt Bldg.
Lombard 5600

owe Trap Rock Co. ..Rl. Est. Tr. Bldg.
Pennypacker 4901

tterson, Robert, & Son, Inc.
Cherry St. Wharf
Rittenhouse 4936 Race 1194

BUILDING MATERIAL—GRAVEL

tterson, Robert, & Son, Inc.
Cherry St. Wharf
Rittenhouse 4936

hila. Transportation & Lighterage Co.
119 Walnut St.
Lombard 0178

n Sciver Corp. ..24th St. bel. Parkway
Rittenhouse 6610 Race 2421

arner, Chas., Co. ..Franklin Tr. Bldg.
Rittenhouse 0842 Race 3379

BUILDING MATERIAL—LIME AND CEMENT

nnor, Martin F.
Wister St. & Reading R. R.
Germantown 3236

ame .....62d St. & Eastwick Ave.
Woodland 7520

gherty's Building Material Co.
Washington & Passyunk Aves.
Walnut 0281 Main 3904

dington Lumber & Supply Co.
Eddington Sta. P. R. R.
Cornwells 222
Torresdale 7110

BUILDING MATERIAL—LIME AND CEMENT—Continued

Frost, Wm. M., & Co.
Welsh Rd. N. Montague St.
Holmesburg 1126

Gilbert, Harry W. ..9th & Venango Sts.
Tioga 4712 Park 4825

Jarden, W. A., & Co.
55th St. & Lancaster Ave.
Belmont 0321 West 1926

Kelly's, M. Sons, Inc. .31st & Poplar Sts.
Evergreen 9560

Lotz, F. A., & Co. ..2137 N. American St.
Regent 6012 Park 2944

Mount Vernon Supply Co.
Umbria & Gates Sts.
Manayunk 3110

Northeast Builders' Supply Co.
2d St. & Fishers Ave.
Michigan 0463

South Phila. Builders' Supply Co.
25th & Tasker Sts.
Oregon 8701 Race 1278

Strathman, Henry E., Inc.
Ontario St. Wharf, Pier 181
Regent 6091

Van Sciver Corp. ....24th St. & Parkway
Rittenhouse 6610 Race 2421

Warner, Chas., Co. ..Franklin Tr. Bldg.
Rittenhouse 0842

West Jersey Sand & Supply Corp.
Delaware Ave. & Marlborough St.
Regent 7120 East 8982

Whelan, Jas. J., & Co.
24th St. & Sedgley Ave.
Columbia 6060 Park 2442

Patterson, Robert, & Son
Cherry St. Wharf
Rittenhouse 4936 Race 1194

BUILDING MATERIAL—METAL LATH

Consolidated Expanded Metal Co.'s
1083 Germantown Ave.
Market 1468 Park 4188

Pearce Fireproof Co. ....1911 N. 2d St.
Regent 9840 Park 1115

Penn Metal Co. ....25th & Wharton Sts.
Jackson 6300 Race 6916

Berger Manufacturing Co.
16th St. & Washington Ave.
Oregon 1443 Race 7495

Van Sciver Corp. ...24th St. & Parkway
Rittenhouse 6610 Race 2421

Patterson, Robert, & Son
Cherry St. Wharf
Rittenhouse 4936 Race 1194

BUILDING MATERIAL—PLASTER

California Stucco Products Co. of Phila.
807 Chestnut St.
Lombard 6791 Main 8217
(See advertisement page 142)
Ever Ready Plaster Co.
2019 W. Madison St.
Tioga 5669
Patterson, Robert, & Son, Inc.
Cherry St. Wharf
Rittenhouse 4936 Race 1194
Smith, Edw. A., & Son ...1015 Fkd. Ave.
Regent 2662
U. S. Gypsum Co. .....Otis Bldg.
Rittenhouse 6161 Race 6681
Van Sciver Corp. ..24th St. & Parkway
Rittenhouse 6610 Race 2421

BUILDING MATERIAL—SAND—BUILDING SAND

Patterson, Robert & Son, Inc.
Cherry St. Wharf
Rittenhouse 4936 Race 1194
Phila. Transportation & Lighterage Co.
119 Walnut St.
Lombard 0178 Main 4394
Van Sciver Corp. ..24th St. bel. Parkway
Rittenhouse 6610 Race 2421
Warner, Chas., Co. ..Franklin Trust Bldg.
Rittenhouse 0842 Race 3379

BUILDING MATERIAL—PLASTER BLOCKS

Venzie, F. M. & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317

BUILDING PAPER

(See Paper—Building)

BULK WINDOWS

(See Windows—Bulk Windows)

BULLET-PROOF GLASS

(See Glass—Bullet-Proof Glass)

BURGLAR ALARMS

Allegheny Alarm Co.
1215 W. Allegheny Ave.
Tioga 4514
Galerman, B .....505 N. Marshall St.
Market 0658

BURGLAR ALARMS—Continued

Holmes Electric Protective Co. of Phila.
11th & Sansom Sts.
Pennypacker 1501 Main 8030
Pangburn, Truman, A.
220 Haddon Ave., Westmont, N. J.
Collingswood 1140-R
Simons Siren Bandit Alarm System
1005 N. Bodine St.
Market 2716

BURGLAR PROOFING

Aubel, F. & E., Co. .....2503 Gtn. Ave.
Columbia 8158 Park 2316

BUILDINGS—PORTABLE IRON AND STEEL

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See Advertisement page 36)
Cantley & Co. .....Harrison Bldg.
Rittenhouse 8962 Race 6640
(See advertisement page 69)
Clopp, George B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)
Bailey, Edward J. & Son
E. Girard Ave. & Earl St.
Regent 2304 East 8444
Gregory & Miller .....536 Hermit St.
Manayunk 1374
Johnson, T. S., Sons Co....626 Cherry St.
Market 5538 Main 1154
Martin Steel Products Co. ..17 N. 21st St.
Rittenhouse 5567
Moister, M. & Co.
Hunting Park Ave. & American St.
Wyoming 4833 Park 2124

CABINETS—BATHROOM CABINETS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

CABINETS—ELECTRIC CABINETS

Baring Sheet Metal Work
416 N. Wiota St.
Baring 1704 West 1029

CABINETS—IRONING BOARD CABINETS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Murphy Door Bed Co. ..Bulletin Bldg.
Spruce 6680 Race 6043

CABINETS—KITCHEN CABINETS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Murphy Door Bed Co. ....Bulletin Bldg.
Spruce 6680 Race 5043
Phila. Gas Range Co. .....1026 Arch St.
Walnut 6912 Race 6570
Swart, M. E. .....Lincoln Bldg.
Rittenhouse 2795 Race 1028

CABINETS—MEDICINE CABINETS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Circle, S., Mfg. Co. .....2234 N. 28th St.
Columbia 5875
Henderson, N. E. & Son, Inc.
1320 Race St.
Locust 0272 Race 3314
Murphy Door Bed Co. ....Bulletin Bldg.
Spruce 6680 Race 5043

CABINETS—STEEL MEDICINE CABINETS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Ness Warming & Ventilating Co.
844 N. Broad St.
Alan G. Smith, Agent
Poplar 3039 Park 4406
Jamestown Metal Products Inc.
Bulletin Bldg.
Rittenhouse 8127
"White Steel Medicine Cabinets"
Sewell, A. J., Co. .....1505 Arch St.
Locust 0619 Race 2604

CABINETS—RADIATOR CABINETS

Berken, The J. D., Co. ..Jefferson Bldg.
Walnut 0686
(See advertisement page 117)
Sylvester, William H. & Son
1807 N. Howard St.
Garfield 0611
(See advertisement page 307)
Hunter, Clarke D., Co. ..Widener Bldg.
Rittenhouse 7395
Hinton & Kolb, Inc. ....719 N. Broad St.
Poplar 7586
Modern Steel Products Co. ..The Bourse
Lombard 9300
Radiator Cabinet Co. .....Drexel Bldg.
Lombard 4900

CABINETS—RADIATOR CABINETS —Continued

White, E. S. .....1505 Race St.
Locust 0825
American Metal Products Corp.
104 S. 52d St.
Allegheny 4811

CABINETS—RADIO CABINETS

Lester Talking Machine Co.
5119 Wakefield St.
Wyoming 4078
Diamond Cabinet Co., Inc.
3542 N. Carlisle St.
Tioga 3616

CABINETS—STEEL STORAGE CABINETS

Penn Metal Co. ..25th & Wharton Sts.
Jackson 6300 Race 6916

CABINET HARDWARE

(See Hardware—Cabinet Hardware)

CABINET WORK

Kramer Woodworking Co., Inc.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
(See advertisement page 22)
Cruice, Frank A. .. 21st St. & Ridge Ave.
Stevenson 3168 Park 2148
Diamond Cabinet Co., Inc.
3542 N. Carlisle St.
Tioga 3616
Elliot, C. Warner .....1534 N. Peach St.
Belmont 4236
General Woodworking Co.
1216 N. Mascher St.
Regent 6620 Park 2176
Lester Talking Machine Co.
5119 Wakefield St.
Wyoming 4078

CABLE—STEEL CABLE

Amer. Cable Co., Inc...8th & Locust Sts.
Lombard 7266 Main 9137
Coates & Rainear, Inc. ..244 N. 22d St.
Rittenhouse 6930 Race 7444
Leschen, A. & Sons Rope Co.
31st & Chestnut Sts.
Evergreen 8100
Roebling's, John A., Sons Co.
223 Arch St.
Market 2751 Main 6531

CAISSONS

Foundation & Construction Co.
1320 Race St.
Locust 0272
(See advertisement page 44)

CALKING—BUILDING CALKING

Air-Proof Calking Co.
6657 N. Blakemore St.
Victor 5366
Keystone Calking Co. .4937 Friendship St.
Mayfair 2098
Phila. Calking Co. ..1725 W. Girard Ave.
Stevenson 6288
Weather-Proof Calking Co.
2417 Fitzgerald St.
Jackson 0570
Weathertite Calking Co.
3712 N. Sydenham St.
Michigan 6142

CALKING—MASONRY CALKING

Ev-Air-Tight Calking Co.
1516 Summer St.
Rittenhouse 9487
Weathertite Calking Co.
3712 N. Sydenham St.
Michigan 6142

CALKING—WINDOW CALKING

Air-Proof Calking Co.
6657 N. Blakemore St.
Victor 5366
Keystone Calking Co. 4937 Friendship St.
Mayfair 2098
Phila. Calking Co. ..1725 W. Girard Ave.
Stevenson 6288
Weathertite Calking Co.
3712 N. Sydenham St.
Michigan 6142

CARPENTERS

A-1 Porch Enclosure Co.
248 W. Wingohocking St.
Wyoming 7355
Alahverde, J. S., & Son.2625 N. Jessup St.
Diamond 4037-W
Allen, Edw. G. .....1517 Wood St.
Rittenhouse 5131
Allisan, Frank W. .....265 S. 20th St.
Pennypacker 3497
Aubermann, Henry, & Son
1429 N. 5th St.
Diamond 8749-W
Bale, Thos. Rolland .....3364 Rand St.
Garfield 0768-M

CARPENTERS—Continued

Barish, B. .....142 N. 11th St.
Walnut 1521
Bauer, John W. .....2723 N. 25th St.
Diamond 5871
Beckerman, H. .....623 Morris St.
Jackson 3762
Berger, Harry .....2337 N. 31st St.
Columbia 6270
Best Bilt Porch Enclosure Co.
7127 Grays Ave.
Woodland 4004
Block, Monroe .....1235 N. 10th St.
Stevenson 9167
Borsos, Louis .....2969 N. Fairhill St.
Tioga 8783
Braun, Oliver J., Bros.
113 E. Moreland St.
Chestnut Hill 4804
Brown, David .....6766 Gtn. Ave.
Germantown 3363
Bryna, Leopold ....7010 Rising Sun Ave.
Fox Chase 2065
Buchholtz, Karl .....2001 E. Orleans St.
Garfield 0735-J
Buzby & Propert .....1658 Unity St.
Jefferson 8360
Caie, Alex .....48 E. Chestnut Ave.
Chestnut Hill 0246
Campbell, C. C. .....6419 Bingham St.
Fox Chase 1585-W
Carter, Irving .....180 W. Price St.
Germantown 8553
Cherry, M. .....137 N. 10th St.
Walnut 5024
Cheskis, B. .....1015 Cherry St.
Walnut 3440
Christopher, Joseph .....1140 S. 7th St.
Oregon 2649
Clark, C. E. .....116 N. Camac St.
Locust 4524
Clark, Herbert T. .....1914 N. 17th St.
Stevenson 8619
Clarke, Thomas .....1821 Church St.
Jefferson 7272
Codori, John A. .....1235 Arch St.
Spruce 2024
Cohen, Frank .....1014 S. 2d St.
Lombard 8468
Collins, Wm. F. ....1945 N. Mascher St.
Regent 3496
Collyer, F. H. .....1632 Blavis St.
Michigan 6690
Conlin, Jas. P. .....644 N. 12th St.
Poplar 4189
Cook, Jas. K. .....4361 N. 4th St.
Wyoming 2660-W
Cook, M. G. .....1927 W. Dauphin St.
Columbia 7390

CARPENTERS—Continued

Cooper, A. K. .....5232 Beaumont Ave.
Woodland 6717
Cowen, Jas. J. .....2663 Collins St.
Regent 2880
Crecelius, Wm., Jr. ....1723 Snyder Ave.
Oregon 2208
Crouthamel, J. F. .....1543 Belfield Ave.
Michigan 3650
Cumberland, Wm. H..4927 Rubicam Ave.
Wyoming 8159
Cunningham & Wurzer
2555 Carpenter St.
Jackson 3351
Dennis, Arthur .....1529 N. 54th St.
Belmont 6972
D'Espinosi, Dominick ....1442 S. 13th St.
Oregon 5529
Dinkelacker, H. F. .Ruan & Leiper Sts.
Jefferson 9016
Dinkelacker & Keating, Inc.
Ruan & Leiper Sts.
Jefferson 9016
Donosa, Joseph .....2439 N. 9th St.
Columbia 5604
Donosa-Krick Co. .....2439 N. 9th St.
Columbia 5604
Donovan, Chas. H. .....619 N. 52d St.
Belmont 9648
Donovan, Chas. H. .....659 N. 52d St.
Belmont 3330
Dougherty, Geo. C. ...2041 Moravian St.
Locust 1372
Dougherty, Geo. L. ...2041 Moravian St.
Locust 1372
Dreher, Stephen .....4034 Gtn. Ave.
Michigan 4776
Easterbrook, Wm. .....146 N. 4th St.
Market 3379
Eigenbauer, Frank J.
5207 N. Marshall St.
Michigan 3315
Enz, George .....1526 N. Newkirk St.
Stevenson 9337
Erb's, Wm. H., Sons
4533 Springfield Ave.
Woodland 0931
Woodland 8671
Errera, Samuel .....1908 S. 13th St.
Jackson 4470
Erwin, Elmer G. ..1635 N. Sydenham St.
Stevenson 7770
Eves, George .....1831 Brandywine St.
Poplar 4687
Evitts, Walter A.
4918-20 Fairmount Ave.
Belmont 3165

CARPENTERS—Continued

Ewing, Reed G. .....2506 N. 17th St.
Diamond 6632
Fassett, Chas. M. .....118 N. 59th St.
Granite 6356
Ferguson, Wm. R. .....405 S. 21st St.
Locust 1895
Ferguson, Wm., & Son ...405 S. 21st St.
Locust 1895
Fields, Milton .....4442 Cresson St.
Manayunk 0182
Finnegan, Joseph .....7127 Grays Ave.
Woodland 4004
Fitzgerald, J. A., Sons .1623 Snyder Ave.
Oregon 0982
Fogel, Frank .....528 Bainbridge St.
Lombard 4347
Ford, George S. .....1942 DeLancey St.
Pennypacker 5087
Gaertner, Jacob .....8315 Pine Rd.
Fox Chase 1135
Galbraith, Harry .....2133 S. Frazer St.
Woodland 1195-W
Gamber, Branson V...1615 N. Carlisle St.
Stevenson 4697
Geithner, Hermann F. ...1322 N. 28th St.
Poplar 2774
Gelman, Samuel .....4656 Boudinot St.
Michigan 6123
Gemunden, George .....4265 N. 7th St.
Gladstone 0569-J
Generette, H. J. C. .....907 S. 16th St.
Jackson 3826
Gerber, A. D. .....229 Sansom St.
Lombard 4607
Gibbons, M. F. ....5420 Larchwood Ave.
Granite 9191
Gillespie, Frank ....2547 W. Oakdale St.
Diamond 6333-W
Glattle, John C., Jr. .....5522 N. 2d St.
Waverly 4263
Gordon, Joseph A. ....321 S. Camac St.
Penypacker 1482
Gradwell, Frank ...215 E. Bringhurst St.
Michigan 0806
Greenberg, Samuel ..954 N. Franklin St.
Market 3198
Grice, Robert K. .....255 N. 52d St.
Sherwood 8661
Guenzel, Herman C...410 Buttonwood St.
Market 1173
Hair, Wm. .....1706 Delancey St.
Pennypacker 5642
Happ, Oscar J. G. .....3927 N. 10th St.
Michigan 3845

CARPENTERS—Continued

Harris, Evan W. .....459 N. 10th St.
Poplar 5440
Hatzfeld, Edward S. ....1828 N. 16th St.
Diamond 10459
Hause, Jacob .....4536 N. 16th St.
Wyoming 7079-W
Hazzard, Joseph R. ...2204 Manning St.
Locust 6394
Heffner, E. A. .....6361 Cherokee St.
Germantown 2046
Heise, Joseph .....919 W. Butler St.
Michigan 2075
Henshaw Bros. .....634 W. Johnson St.
Germantown 1421
Hess, James .....205 Ionic St.
Lombard 3551
Hillsley, Wm. S. .....2052 Sansom St.
Locust 0541
Hoffman, Arthur A. ..664 N. Preston St.
Baring 8089
Hoffman, Simon ....664 N. Preston St.
Baring 8089
Hoffman, Simon, & Son
664 N. Preston St.
Baring 8089
Hofmaier, Henry ....7342 N. Dorcas St.
Fox Chase 0757
Home Bettering Co.
1920 E. Clementon St.
Garfield 0470
Hoover, F. L., & Sons, Inc.
1023 Cherry St.
Walnut 5180
Horting & Connell .....609 Cherry St.
Market 1764
Hotz, Fred G. .....27th & Parrish Sts.
Poplar 6140
Howard, Frank L. .....917 N. 48th St.
Belmont 5509
Howe, Joseph W. .....3610 N. 22d St.
Tioga 6220
Hudson, Fred L. .....2538 Sepviva St.
Regent 5359
Hummel, Andrew
2057 E. Allegheny Ave.
Garfield 3240-W
Hund, Franklin C. ....3427 N. Helen St.
Regent 3338
Huskey, Samuel..4135 Germantown Ave.
Wyoming 8273-W
Hutt, J. H. .....5919 Spruce St.
Sherwood 2273
Huttinger, Frank .....535 N. 22d St.
Poplar 9079
Ienni, Philip .....6145 Callowhill St.
Allegheny 1711

CARPENTERS—Continued

Jacobs, Harry R.
13th St. & Rising Sun Ave.
Tioga 8909
Jastrzembski, Alex .....4512 Pearce St.
Jefferson 5660
Johnson, Harry R.
1616 W. Passyunk Ave.
Oregon 8891
Johnston, Wm. W. .....1606 Swain St.
Poplar 7975
Jones, Thomas .....2271 N. Bancroft St.
Diamond 3059
Judick, Charles .....7127 Grays Ave.
Woodland 4004
Kaiser, Fredk..248 W. Wingohocking St.
Wyoming 7355
Katz, Max .....626 Tasker St.
Oregon 7080
Keeley, Thos. M. .....4411 Gtn. Ave.
Wyoming 1035
Kelly, Patrick J. .....3445 N. 6th St.
Tioga 5905-J
Kergides, G. & A. .....926 Locust St.
Walnut 0300
Kerr, Andrew .....3433 N. Front St.
Garfield 1916
King, P. J. .....5710 Cedar Ave.
Sherwood 4901
Kirk, Chas. S. .....2850 N. 20th St.
Diamond 1488
Same .....317 S. Juniper St.
Pennypacker 3719
Kirshbaum, Jos. .....725 Cherry St.
Lombard 8212
Kooperman, Jakob .....407 S. 5th St.
Allegheny 7319
Krick, Robert .....2439 N. 9th St.
Columbia 5604
Lam, Building Co. .....1001 Wood St.
Walnut 1552
Lange, W. W. Woodstock & Dauphin Sts.
Columbia 6069
Lantz, C. F. .....1323 N. 60th St.
Granite 9411
Laufer, John J. .....425 N. 10th St.
Walnut 3682
Lawson, Robt. E., Jr. ..1514 Catharine St.
Jackson 0679
Lebovitz, David .....3017 Page St.
Columbia 1631
Lott, William R. .....1509 Vine St.
Locust 6112
Lotz, William F.
Frankford Ave. & Oxford Pike
Jefferson 5815
Lowden, Albert N. .....734 S. 50th St.
Allegheny 5376

CARPENTERS—Continued

Luff, Samuel L. ....1821 Fairmount Ave.
Poplar 4647
Lyon, George C. .....631 S. 42d St.
Evergreen 9264
Mallard, Leonard .....3308 E St.
Garfield 3826
Mallo, Eugene M. 11th St. & Indiana Ave.
Tioga 4197
Manfredi, Louis & Co. ..2228 Mifflin St.
Oregon 7920
Manuel, W. N. .....4512 Woodland Ave.
Woodland 10230
Marchini, Guerino ..1716 McClellan St.
Jackson 1485-W
Massiah, Dudley ....2218 W. Oxford St.
Stevenson 9174
McCall, John T. .....325 S. 13th St.
Pennypacker 4278
McClintock & Weaver 24 Phil-Ellena Sts.
Germantown 3894
McCoy, John .....1215 Summer St.
Locust 4127
McCrath, P. J. .....245 N. 16th St.
Spruce 2476
McGunkin, Jos. P. ....1483 E. Wilt St.
Regent 2054
Mendolia, Joseph & Sons
1314 E. Passyunk Ave.
Oregon 2347
Menke, Harry .....2132 N. 16th St.
Columbia 5982
Miller, C. Edgar, Jr. 1433 N. Sydenham St.
Stevenson 7139
Miller, C. Edgar, Jr. ..4751 N. Camac St.
Wyoming 1422
Miller, Harold E. .....2528 Coral St.
Regent 0573
Moffett, John W. .....1861 N. 21st St.
Stevenson 4345
Monaghan Bros. .....2615 N. 6th St.
Regent 0582
Monaghan, Thomas B. ..2009 Sansom St.
Locust 1343
Montgomery, Wm. ..2327 W. Oxford St.
Stevenson 8659
Moore, James H. ..1939 E. Somerset St.
Regent 3505
Morrow, Wm. W. .....320 Harmony St.
Lombard 0569
Muller, Curt .....313 Roselyn Ave.
Majestic 3503
Myers, E. E. .....4900 Knox St.
Wyoming 2782
Nibouar, Wm. H. .....5248 Mascher St.
Michigan 3846
Nicholas, E. E. .....239 N. Alden St.
Sherwood 6414

CARPENTERS—Continued

Niehenke, John J. .....1620 N. 18th St.
Stevenson 8380
Norton, Charles G. ....5521 Girard Ave.
Granite 1677
Novelty Home Remodeling Co.
1314 Passyunk Ave.
Oregon 2347
Olson, Peter .....1302 S. 10th St.
Oregon 9224
Ott Bros. ..... 3747 N. 15th St.
Michigan 6078
Pappas, Nicholas .....916 Locust St.
Walnut 8733
Pearlman, Aaron .....2317 S. 8th St.
Oregon 9174
Pierce, W. Nelson ....5514 Chester Ave.
Woodland 3843
Poppe, Charles W. .....2329 N. 11th St.
Diamond 1617
Poserina, H. ..2577 E. Huntingdon St.
Regent 3976
Price, Joseph ...2048 Rittenhouse Square
Locust 2761
Quinn, James A. ..3531 Lancaster Ave.
Evergreen 3468
Rabuck, H. E. ..5942 Lansdowne Ave.
Belmont 8403
Radomski, Frank V. ....4329 N. 16th St.
Michigan 7450
Rahas, Emil J. .....6263 N. 18th St.
Waverly 2664
Ramos, Clarence .....2535 S. 73d St.
Woodland 2839
Ramos & Wiggins .....732 S. 51st St.
Granite 3857
Woodland 2839
Rea, J. Harvey .....213 N. 11th St.
Walnut 6742
Rea, S. J. & Son ..1608 Fairmount Ave.
Poplar 4861
Regan, T. J. .....2406 W. Lehigh Ave.
Columbia 2673
Reilly, John .....3402 N. 17th St.
Tioga 4913
Resnick, David .....5247 Jefferson St.
Belmont 4721
Robin, Philip .....1037 Wagner Ave.
Wyoming 6086
Rodgers, Arthur A. ....1608 Mentor St.
Michigan 7980
Rosenbaum, Samuel
2727 W. Montgomery Ave.
Stevenson 8777
Rosenberg, D. .....2510 S. 8th St.
Oregon 5808

CARPENTERS—Continued

Royal Home Improvement Co. 52 N. 60th St. Granite 3163
Rust, Harry R., Inc. .....724 Ludlow St. Lombard 6877
Sanders, Samuel S. ....1232 Marlboro St. Regent 2619
Sanders, T. Henry B. ..1234 Marlboro St. Regent 2549
Santamarie, Philip J. 1241 W. Cumberland St. Diamond 3871
Scheible, Frederick .....3467 Jasper St. Regent 5459
Schleyer, Albert ....907 E. Church Lane Germantown 6530
Schubert, F. & F. .....4458 N. Reese St. Michigan 0533
Schubert, Frederick V. 4458 N. Reese St. Michigan 0533
Schumacker, Frederick A. 2829 W. Harold St. Columbia 2415
Scott, Joseph .....3933 N. 8th St. Michigan 1507
Searles, F. S. .....5142 Thompson St. Belmont 4020
Serotta, Aaron .....2319 S. 10th St. Oregon 8589-W
Seward & Bender .....56 W. Haines St. Germantown 9543
Sheck, Walter D. ....2030 E. Ontario St. Regent 6991
Shmukler, J. N. .....1961 N. Stanley St. Columbia 4965
Shroeder, Albert .....3217 N. Lee St. Regent 2779
Slater, J. C. .....717 Lex St. Baring 0187
Snell, John .....5130 Race St. Sherwood 8614
Sorber Carpentry Co. ....18 Harvey St. Germantown 6390
Sorber, Wm. P. .....18 Harvey St. Germantown 6390
Sorensen, P. A. .....1133 Callowhill St. Walnut 0643
Spenard, A. H. .....822 Wood St. Walnut 6878
Stees, Ernest J. .....2236 N. Reese St. Regent 0610
Strenger, Ernest R. ....3617 Calumet St. Germantown 9260
Strode, R. W. & Sons ....12 N. 19th St. Spruce 4895
Taylor, John, Sr. ....2628 Braddock St. Regent 6780

CARPENTERS—Continued

Thayer, George W. ....109 N. Camac St. Spruce 7641
Thompson, A. .....2628 W. Fletcher St. Diamond 4180-J
Trexler, Howard ....212 E. Hortter St. Germantown 0215
Truitt, G. B. .....1000 S. Paxon St. Woodland 5168
Urban, John J. .....232 Ionic St. Lombard 0588
Vaughan, Willam F. .....321 Cherry St. Market 4072
Virden, B. F. .....2917 Fletcher St. Columbia 7395
Walsh, Edmond A. ..309 E. Cornwall St. Garfield 0581
Warfel, Theo. L. .....918 N. 13th St. Stevenson 4389
Warfield, J. B. .....2032 Fitzwater St. Locust 5829
Warren & Co. .....1113 Cherry St. Walnut 1919
Warren, W. B. .....1423 N. 56th St. Sherwood 2165
Weiler, Andrew E. .....2754 N. 12th St. Columbia 8065
Weisman, N. ....4805 N. Hutchinson St. Michigan 7510
Wells, C. F. & Son .....124 S. 36th St. Evergreen 2565
Wentzell, Edward D. ..1322 Eleanor St. Wyoming 7240-W
Whalen, Thomas W. ....140 N. 11th St. Walnut 4880
Whiteside, Rush J. & Son 2115 Wallace St. Poplar 2302
Wiggs, F. .....340 Sentner St. Fox Chase 2479
Wilson, James H. ....1717 Moravian St. Rittenhouse 1742
Wintz, Frank I., Inc. ....1618 N. 27th St. Stevenson 5200
Wintz Bros. .....1618 Sellers St. Jefferson 0432
Wolverton & Co. 224 E. Willow Gr. Ave. Chestnut Hill 0578
Woodward, L. .....1709 Panama St. Pennypacker 2595
Worthington, Wm. N. ..1033 S. 52d St. Woodland 4916
Yerger, Harvey H. .....4430 N. 19th St. Wyoming 5958
Yost, Gilbert .....1040 W. Stella St. Tioga 9116-W
Young Bros. Willow Grove Ave. W. Flourtown Rd. Chestnut Hill 1758

CARPENTERS—CONTRACTING CARPENTERS

ollins Construction Co. ..1501 Arch St.
Rittenhouse 6742
(See advertisement page 52)
otz, Wm. F. ..Oxford Bank Bldg., Fkd.
Jefferson 5815 East 7730
(See advertisement page 52)

CASEMENT SASH

(See Windows—Casement Windows)

ASTINGS—ALUMINUM CASTINGS

me Brass Fdry. 4317 N. American St.
Michigan 7850
merican Manganese Bronze Co.
Rhawn & Hegerman Sts.
Holmesburg 1600 East 7787
ousley's, Chas., Sons ..457 N. 12th St.
Poplar 4296 Race 3744
olle Casting Co., Inc. ..2814 Bridge St.
Jefferson 3363 East 8406
eeler-Hemsher Co. 811 Fairmount Ave.
Market 0773 Main 4339

CASTINGS—BRASS CASTINGS

me Brass Foundry 4317 N. Amer. Bldg.
Michigan 7850
merican Manganese Bronze Co.
Rhawn & Hegerman Sts.
Holmesburg 1600 East 7787
idesburg Foundry & Engineering Co.
Harrison Bldg.
Rittenhouse 0460 Race 3011
eeler-Hemsher Co. 811 Fairmount Ave.
Market 0773 Main 4339

ASTINGS—BRONZE CASTINGS

nerican Manganese Bronze Co.
Rhawn & Hagerman Sts.
Holmesburg 1600 East 7787
lle Casting Co., Inc. ..2814 Bridge St.
Jefferson 3363 East 8406
eeler-Hemsher Co. 811 Fairmount Ave.
Market 0773 Main 4339

ASTINGS—BRONZE CASTINGS—ACID RESISTING BRONZE CASTINGS

ne Brass Foundry ..4317 N. Amer. St.
Michigan 7850
lle Casting Co., Inc. ..2814 Bridge St.
Jefferson 3363 East 8406

CASTINGS—GRAY IRON CASTINGS

Aetna Foundry Co., Inc.
Ruffner & Blaine Sts.
Michigan 4170
American Engineering Co.
Aramingo & Cumberland Sts.
Regent 7140 East 7991

CASTINGS—IRON CASTINGS

Creswell, Samuel J., Iron Works
23d & Cherry Sts.
Rittenhouse 6877 Race 2538
(See advertisement page 36)
Olney Fdry. Co. 180 W. Duncannon Ave.
Michigan 0450
Wood, R. D. & Co. ....400 Chestnut St.
Lombard 1020 Main 5731
Yocum, Jas. & Son, Inc. ..145 N. 2d St.
Market 0483 Main 1123

CASTINGS—MALLEABLE IRON CASTINGS

Berger Bros. Co. .....229 Arch St.
Market 1551 Main 4066

CASTINGS—STEEL CASTINGS

Cann & Saul Steel Co. 516 Commerce St.
Lombard 8256 Main 4318
Duquesne Steel Foundry Co.
Pennsylvania Bldg.
Rittenhouse 7121
Federal Steel Foundry
Richmond & Norris Sts.
Regent 6000 East 7101
Lebanon Steel Foundry ..1418 Walnut St.
Pennypacker 6577

CAST STONE

(See Stone—Cast Stone)

CEILINGS—METAL CEILINGS

Art Metal Ceiling Co. ....2933 Poplar St.
Poplar 3604
Berger Mfg. Co. 16th & Washington Ave.
Oregon 1443 Race 7495
Gregory & Miller .....536 Hermit St.
Manayunk 1374
Penn Metal Co. ....25th & Wharton Sts.
Jackson 6300 Race 6916

CELLAR DOORS

(See Doors—Cellar Doors)

CELLAR DRAINS
(See Drains—Cellar Drains)

CELOTEX WALLBOARD
Gillingham Co., The
Norris & Richmond Sts.
Regent 8450 East 7975

CEMENT—FIRE CEMENT
Botfield Refractories Co.
776 S. Swanson St.
Lombard 3488 Main 9122
Remmey, Richard C., Son Co.
Hedley St. & Delaware River
Regent 8200 East 9078

CEMENT—HIGH TEMPERATURE CEMENT
Carey, Philip, Co., 24th St. & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

CEMENT—PORTLAND CEMENT
(See Building Material—Lime And Cement)

CEMENT BLOCKS
(See Concrete Blocks)

CEMENT FINISH
Carson Waterproofing Co.
1700 Walnut St.
Pennypacker 9265 Race 5148
(See advertisement page 146)

CEMENT PAVING
(See Paving—Concrete Paving)

CESS POOL COVERS
(See Covers—Cess pool)

CHAIN—SILENT CHAIN
Latimer, Robert L., & Co.
24 N. Front St.
Market 0335 Main 5621
Link Belt Co.
Hunting Park Ave. & Nicetown St.
Wyoming 8800 Park 5381
Morse Chain Co. .....20 S. 15th St.
Rittenhouse 5958 Race 2614
Whitney Mfg. Co.
401 West Phila. Title Bldg.
Evergreen 2824

CHAIN—LINK CHAIN
Baldwin Service Co. .....151 N. 4th St.
Market 2185 Main 5045
Horton & Stevens Mfgrs.
Memphis & Tucker Sts.
Regent 0252

CHANDELIERS—CRYSTAL CHANDELIERS
McClintock Mfg. Co.,
1101 Spring Garden Street
Poplar 0581

CHAPMAN VALVES
Chapman Valve Mfg. Co. ..1019 Arch St.
Walnut 1057 Race 4670

CHILDS FIRE PROTECTION APPARATUS
Castle, Jas. M., Inc. .....1718 Vine St.
Rittenhouse 5996

CHIMNEYS—ERECTING CHIMNEYS
Ballard, Sprague & Co., Inc.
Morris Bldg.
Rittenhouse 9730
Mann, M. J. .....4206 Chestnut St.
Evergreen 4210
Williams, Wm. E., & Son
2134 Market St.
Rittenhouse 3827

CHIMNEYS—CLEANING CHIMNEYS
Hults, Ellsworth R. .....273 S. 5th St.
Lombard 1774

CHIMNEYS—IRON AND STEEL
Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Keystone Boiler Works ....52 N. 23d St.
Rittenhouse 7977

CHIMNEY REPAIRS
Atkinson, Francis J. .....308 S. 4th St.
Lombard 5858
Van Duser, A. B. ....638 W. Girard Ave.
Market 4893

CHUTES—ASH CHUTES

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

CHUTES—CLOTHES CHUTES

Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459

CHUTES—COAL CHUTES

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

CHUTES—MAIL CHUTES

Butler Mail Chute Co. ..Rochester, N. Y.

CHUTES—RUBBISH CHUTES

Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459

CHUTES—SPIRAL CHUTES

Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459

Standard Conveyor Co. ..3110 Market St.
Evergreen 2801

CINDER BLOCKS

Phila. Partition & Building Block Co.
28th & Ritner Sts.
Jackson 6278 Race 3553
(See advertisement page 60)

Wallcross, J. Burton ....5600 Gtn. Ave.
Germantown 3040 North 0283
(See advertisement page 146)

CINDER—CONCRETE BLOCKS

Phila. Partition & Building Block Co.
28th & Ritner Sts.
Jackson 6278 Race 3553
(See advertisement page 60)

Wallcross, J. Burton ....5600 Gtn. Ave.
Germantown 3040 North 0283
(See advertisement page 146)

Straub Cinder Block Co.
28th & Ritner Sts.
Jackson 6278
(See advertisement page 60)

CINDERS

Groswith Shuster Contracting Corp.
Pennsylvania Bldg.
Rittenhouse 4575

CIVIL ENGINEERS

(See Engineers—Civil Engineers)

CLAMPS—HOSE CLAMPS

Knox Manufacturing Co., Inc.
821 Cherry St.
Walnut 1466

CLEANOUTS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

CLOSET TEES AND CROSSES

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

CLOSET BENDS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

CLOTHES DRYERS

Henderson, N. E., & Son, Inc.
1320 Race St.
Locust 0272 Race 3314

COAL BUNKERS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

COAL CONVEYORS

(See Conveyors—Coal Conveyors)

COAL HOLE COVERS

(See Covers—Coal Hole Covers)

COLD STORAGE CONSTRUCTION

Livezy, John R.
Glenwood Ave. W. 22d St.
Diamond 4003

COLD STORAGE CONSTRUCTION—Continued

Mundet, L., & Son, Inc. ....329 N. 2d St.
Market 3418
(See advertisement page 128)
Stoutenburgh, I. A. ....3438 Mervine St.
Tioga 2701

COLD WATER PAINTING

(See Painting—Cold Water Painting)

COLUMNS—METAL COLUMNS

Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115

COLUMNS—WOOD COLUMNS

Newell, The A. J., Co. ....1505 Arch St.
Locust 0619

COLUMN MOULDS

Corr-Service Erection Co., Inc.
1713 Sansom St.
Rittenhouse 5747 Race 1776

COMPO BOARD

Howard Ketcham ...330 W. Girard Ave.
Market 3448 Park 1137

COMPRESSORS—AIR COMPRESSORS

(See Air Compressors)

CONCRETE BLOCKS

Bellfield Concrete Products Co.
Bellfield Ave. & Armstrong Lane
Wyoming 6142
(See advertisement page 185)
Penn Bldg. Block Co., Inc.
807 Chestnut St.
Lombard 6791
(See advertisement page 58)
Phila. Partition & Bldg. Block Co.
28th & Ritner Sts.
Jackson 6278 Race 3553
(See advertisement page 60)
Straub Cinder Block Co.
28th & Ritner Sts.
Jackson 6278 Race 3553
(See advertisement page 60)
Shallcross, J. Burton ....5600 Gtn. Ave.
Germantown 3040 North 0283

CONCRETE BLOCKS—Continued

Gleen, George A. .....1210 Filbert St.
Locust 7313
Green, Chas. & Sons ....1236 N. 9th St.
Poplar 1197 Park 4066
Overbrook Block & Supply Co.
2030 Upland Way
Belmont 4367
Walsh, Charles V. 58th & Woodland Ave.
Woodland 5252 West 1148

CONCRETE BREAKING

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)
Plumbers Roadway Breaking Co.
Dover & Somerset Sts.
Columbia 7654 Park 1914
(See advertisement page 102)

CONCRETE BRICK

(See Brick—Concrete Brick)

CONCRETE CONSTRUCTION

Gramm, Harris, Inc.
176 E. Tulpehocken St.
Germantown 6060 North 0132
(See advertisement page 184)
Colen, P. M. .....2603-2617 Poplar St.
Poplar 0536 Race 5626
(See advertisement page 22)
Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 44)
Holmesburg Concrete Co.
Welsh Rd. & Crispen St.
Holmesburg 1014
(See advertisement page 112)
Armstrong & Latta Co. ..1926 Sansom St.
Rittenhouse 1866 Race 4324
Booth Paving & Construction Co.
4355 Frankford Ave.
Jefferson 7566
Corr-Service Erection Co., Inc.
1713 Sansom St.
Rittenhouse 5747 Race 1776
Lam Building Co. .....1001 Wood St.
Walnut 1552 Race 7164
Massiah, Frederick ....1342 Cypress St.
Pennypacker 4165 Race 3760
Reuter, P. N. .....1043 W. Venango St.
Tioga 8693-W
Bloom, Irvin C. .....Flanders Bldg.
Locust 8627

CONCRETE CONSTRUCTION—Continued

Brennan, Frank .....25th & Tasker Sts.
Oregon 8701 Race 1278
Central Concrete Construction Co.
North American Bldg.
Pennypacker 8861
Concrete Construction Co.
1772 N. Bodine St.
Columbia 8545
Davis & Savine .....23 S. 52d St.
Stevenson 3186
Doyle, J. M. .....3010 Chestnut St.
Evergreen 5891
Geshwind, Herbert W. ..761 N. 26th St.
Poplar 3277 Race 5172
Heins, Wm. R. & Co. .1713 Moravian St.
Rittenhouse 7182
O'Neill Co. .....127 E. Mermaid Lane
Chestnut Hill 0850
Scarcia Bros. & Co. ..2078 Margaret St.
Jefferson 2478
White, Wm. & Son ..1918 Brandywine St.
Poplar 2361

CONCRETE CONSTRUCTION—REINFORCED CONCRETE CONSTRUCTION

Colen, P. M. .....2603-2617 Poplar St.
Poplar 0536 Race 5626
(See advertisement page 22)
Gramm, Harris, Inc.
176 E. Tulpehocken St.
Germantown 6060 North 0132
(See advertisement page 44)
Orehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 244)
Reuter, P. N. .....1043 W. Venango St.
Tioga 8693-W

CONCRETE CONTRACTORS

(See Contractors—Concrete Contractors)

CONCRETE FORMS

Metzel Steel Form & Iron Co.
236 N. 23d St.
Rittenhouse 6944
Ward, Lee T. Co. .....619 Filbert St.
Lombard 9009 Main 7789

CONCRETE HARDENERS

Builders' Specialty Co. 1844 N. Front St.
Regent 5911 Park 1373
Master Builders Co. .....Otis Bldg.
Rittenhouse 2231
Anti-Hydro Waterproofing Co.
265 Badger Ave., Newark, N. J.

CONCRETE INSERTS

Branch-Crawford Co. ....1539 Wood St.
Rittenhouse 6252
Security Insert Co. ....145 W. Oxford St.
Regent 9752 Park 2461

CONCRETE LIGHTS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

CONCRETE LINTELS

Bellfield Concrete Products Co.
Bellfield Ave. & Armstrong Lane
Wyoming 6142
(See advertisement page 185)

CONCRETE MACHINERY

Edelen & Boyer Co. ....236 N. 23d St.
Rittenhouse 6944 Race 5504
Equipment Corp. America ..Horn Bldg.
Rittenhouse 5498 Race 7064
Giles & Ransome .....231 N. 12th St.
Walnut 5666
Service Equipment Co. ....211 N. 3d St.
Market 3084 Main 5966
Shannon, J. Jacob & Co. 1744 Market St.
Rittenhouse 1744 Race 1744
Staley & Morris, Inc. ....214 N. 22d St.
Rittenhouse 5160 Race 1988
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

CONCRETE MIXERS

Beckwith Machinery Co.
Front & Brown Sts.
Market 2735 Park 4084
Blystone Mfg. Co. .....520 Arch Street
Lombard 6837 Main 1867
Coates & Rainear, Inc. ....214 N. 22d St.
Rittenhouse 6930 Race 7444
Conboy Co. ..... Perry Bldg.
Rittenhouse 3944
Dravo Equipment Co., Inc...Schaff Bldg.
Rittenhouse 6250 Race 1956
Equipment Corp. America ..Horn Bldg.
Rittenhouse 5498 Race 7064
Jaeger Machine Co. .....619 Filbert St.
Lombard 9009
Kelly, E. B., Co., Inc. .....520 Arch St.
Lombard 6837
Lansing Co. ....N. Amer. & Willow Sts.
Market 1822 Main 7646

CONCRETE MIXERS—Continued

Ransome Concrete Machinery Co.
231 N. 12th St.
Walnut 5666
Service Equipment Co. ....211 N. 3d St.
Market 3084 Main 5966
Service Supply Corporation
20th & Venango Sts.
Tioga 6290 Park 5551
Shannon, J. Jacob, & Co.
1744 Market St.
Rittenhouse 1744 Race 1744
Staley & Morris, Inc. .....214 N. 22d St.
Rittenhouse 5160 Race 1988
Standard Scape & Supply Corp.
510 Arch St.
Lombard 9107 Main 3598
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

CONCRETE PAINT

Elastic Compound Paint Co.
5131 Kershaw St.
Belmont 2070

CONCRETE PAVING

(See Paving—Concrete)

CONCRETE PRODUCTS

Hard-N-Type Engineering Service
20 S. 15th St.
Rittenhouse 3588
Overbrook Block & Supply Co.
2030 Upland Way
Belmont 4367
Weiss, Philip .Fisher Ave & Mascher La.
Michigan 2356

CONCRETE REINFORCING BARS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)
Baker Warehouse ....G & Venango Sts.
Regent 8474 East 7281
Consolidated Expanded Metal Co.
1083 Germantown Ave.
Market 1468 Park 4188
Concrete Steel Company ...Penna. Bldg.
Rittenhouse 5570 Race 5456
Kalman Steel Co. .....1713 Sansom St.
Rittenhouse 5747 Race 1766
Morris Wheeler & Co.
30th & Locust Sts.
Evergreen 5900 West 1601

CONCRETE REINFORCING BARS—Continued

Penn Steel Service Co. .....Fuller Bldg.
Rittenhouse 4955 Race 3597
Laub, W. A., Co. .....1700 Walnut St.
Pennypacker 4747
Phila. Steel Warehouse Co.
Commercial Trust Bldg.
Rittenhouse 0284 Race 3539

CONCRETE REINFORCING MESH

Sellers, S. L., Co. ....1322 N. Front St.
Regent 6447 Park 1245

CONCRETE STONE

(See Stone—Cast Stone)

CONCRETE TILE

(See Tile—Concrete Tile)

CONCRETE SURFACERS

Shannon, J. Jacob Co. ..1744 Market St.
Rittenhouse 1744 Race 1744

CONDUIT—CLAY CONDUIT

Clermont Clay Products Co.
Crozer Bldg.
Rittenhouse 6184
National Fireproofing Co.
Land Title Bldg.
Rittenhouse 4761 Race 2778

CONTRACTORS

Acchione Contracting Co.
1607 McKean St.
Oregon 5178
Acchione, John B. ....1607 McKean St.
Oregon 5178
Acme Construction Co. ..2025 N. 62d St.
Belmont 5790
Adams, Frank L., Co..19th & Walnut Sts.
Rittenhouse 1171
Ambler, Chas. A. .....Harrison Bldg.
Rittenhouse 7129
Ambler-Davis Co. .....Harrison Bldg.
Rittenhouse 7129
American Dredging Co.
Mariners & Merchants Bldg.
Lombard 4243
American Heating Co. ...Elverson Bldg.
Rittenhouse 5966
Anastasi Bros. .....400 Allens Lane
Chestnut Hill 3824

CONTRACTORS—Continued

Andreus, Achille .....437 Righter St.
Roxborough 2020
Angelone, Leandro .....336 E. Price St.
Germantown 1014
Armstrong & Latta Co. .1926 Sansom St.
Rittenhouse 1866
Armstrong & Latta Co.
63d & Walnut Sts.
Sherwood 9945
Armstrong & Latta Co...1926 Sansom St.
Rittenhouse 1866
Ashby, Wm. W. ...7920 W. Oxford Ave.
Fox Chase 1090
Ballinger, R. C., & Co. ..925 Walnut St.
Pennypacker 0191
Barber Engineering & Construction Co.
Commercial Trust Bldg.
Rittenhouse 3043
Baton Construction Co., Inc.
1713 Sansom St.
Rittenhouse 5709
Beccio, M. .....6139 Callowhill St.
Allegheny 8051
Belmonte, V. .....204 E. Haines St.
Germantown 3804
Bent Stedman .....15th & Locust Sts.
Pennypacker 8270
Biffoni & Co. .....1930 Roberts Ave.
Michigan 3320
Black, Jas., Sr. ....6715 W. Oxford Ave.
Fox Chase 2462
Blatz, Francis J..3446 E. Wellington Ave.
Mayfair 2170
Block, Monroe .....1235 N. 10th St.
Stevenson 9167
Bloomingdale, Alfred M. .117 Walnut St.
Lombard 2383
Blundy, Frank .....1528 S. 20th St.
Jackson 3720
Boas, F. J. .....4922 N. Broad St.
Wyoming 8094
Boas, F. J. .....Broad St. & Erie Ave.
Michigan 1296
Same .....Broad St. & Lehigh Ave.
Columbia 3160
Same ..... Subway
Spruce 2359
Same .....Subway Constr..
Broad St. & Girard Ave Sta.
Stevenson 3322
Botfield, A. H. B., Jr. ....2037 Fkd. Ave.
Regent 7313
Botvan, Max .....1749 N. 31st St.
Columbia 4386
Boyd, David J. .....2326 N. 8th St.
Columbia 4962
Boyd, Thos. .....114 W. Turner St.
Regent 9086

CONTRACTORS—Continued

Brann & Stuart Co. ...Comrcl. Tr. Bldg.
Rittenhouse 3201
Brann & Stuart Co. .....1 & P. R. R.
Garfield 2289
Braudy, Harris .....500 N. 61st St.
Sherwood 9785
Braunstein, Herman ...325 Fitzwater St.
Lombard 8648
Breen, Maj. Jos. W.
Wyalusing Ave. & Fallon St.
Belmont 9292
Brennan, Frank X. ...25th & Tasker Sts.
Oregon 8701
Brenneman, J. E., Co.
1519 North American Bldg.
Pennypacker 5636 Race 6512
Brogan, Jas. F., & Co. .Comrcl. Tr. Bldg.
Rittenhouse 2943
Brosz, Paul ....2515 W. Huntingdon St.
Columbia 0842
Brown, David C. .....4106 Merrick St.
Manayunk 2284
Brown, H. F. .....6100 Ridge Ave.
Roxborough 3269
Brown-King Construction Co.
Commercial Trust Bldg.
Rittenhouse 0277
Brown, M. J. ..2610 E. Monmouth Ave.
Regent 0269
Brown, Samuel D. .....919 S. 17th St.
Jackson 3033
Buchanan, Frank M. ....687 N. Broad St.
Poplar 5414
Buckley, J. F. .....4001 Sansom St.
Evergreen 8937
If no answer call Woodland 1457-R
Butler, J. J. .....5747 Vine St.
Sherwood 3662
Butler & Orlando .....5747 Vine St.
Sherwood 3662
Byers & Clarkson garage
17th & Kater Sts.
Oregon 9189
Cameron, Wm. P. .....Packard Bldg.
Rittenhouse 6396
Campitelli, Nick .....6120 Callowhill St.
Granite 1621
Campitelli & Carosella
6120 Callowhill St.
Granite 1621
Cannoe, N. .....Broad & Rockland Sts.
Wyoming 4156
Cantono, Felix .....1720 Cayuga St.
Michigan 6366
Carlin, Wm. P. .....1501 Arch St.
Rittenhouse 6742
Carr & Courtenay .....3025 Poplar St.
Poplar 7381

CONTRACTORS—Continued

Chambley, Alexander ....3649 Filbert St.
Evergreen 4456
Chestnut Hill Construction Co.
8014 Roanoke St.
Chestnut Hill 4897
Chestnut Hill Contracting & Graystone Quarry Co. .....9 E. Moreland Ave.
Chestnut Hill 0688
Chestnut Hill Masonry & Contracting Co.
7725 Germantown Ave.
Chestnut Hill 4446
Christensen, Adolph ....843 Cameron St.
Poplar 0153
Christopher, James G. ..26 E. Collom St.
Victor 1706
Christy, Wm. & Son ..1614 McKean St.
Oregon 0437
Cimorelli Bros. .....1327 S. 7th St.
Jackson 6502
Clauss, Felix H. ..6th St. & Lindley Ave.
Michigan 6880
Codori, John A. .....1235 Arch St.
Spruce 2024
Cohen, L. J. .....1634 W. Mentor St.
Michigan 5896
Cohen, Sam .....2620 N. 28th St.
Diamond 1369-W
Colen, P. M., Co. .....2603 Poplar St.
Poplar 0536
Collins Construction Co. ..1501 Arch St.
Rittenhouse 6742
Collins, Joseph H. .....1501 Arch St.
Rittenhouse 6742
Comerford Construction Co.
1518 Walnut St.
Pennypacker 5606
Commercial Contracting Co.
530 Vernon Rd.
Germantown 4292
Commonwealth Construction Co.
13th & Shunk Sts.
Oregon 2017
Compressed Air Service Corp.
1015 Chestnut St.
Night Call Allegheny 8448
Walnut 6488
Conneen, M. L. & Son ..4023 Market St.
Evergreen 1629
Conner, John L. .....Schaff Bldg.
Rittenhouse 6957
Connor, James ....2820 Frankford Ave.
Regent 5542
Connor, Jno. L. ..65th St. & Chester Ave.
Woodland 3595
Connor, Thomas .....3621 N. 5th St.
Regent 5770
Conti, John .....81 E. Moreland Ave.
Chestnut Hill 2752

CONTRACTORS—Continued

Cooper, A. K. .....5232 Beaumont Ave.
Woodland 6717
Covell, C. E. .....1015 Chestnut St.
Walnut 5094
Cramp & Co. .....Denckla Bldg.
Walnut 0186
Cravero, Nicholas .....2960 N. 24th St.
Columbia 8713
Crockett, Contracting Co.
4729 Ludlow St.
Allegheny 2441
Cronin, Wm. J., Jr. ....1628 Market St.
Rittenhouse 8791
Crossan, Arthur B. .....Land Title Bldg.
Rittenhouse 2666
Crossan, Clarence K. ..Land Title Bldg.
Rittenhouse 2666
Crossan Const. Co. ....Land Title Bldg.
Rittenhouse 2666
Cunningham, T. W., Jr. ..Widener Bldg.
Rittenhouse 9917
Curtis Bros. .....State Rd.
Tacony 1816
Curtis Co. .....923 Market St.
Walnut 8424
Curtis Co. .....10 S. 18th St.
Rittenhouse 2885
Curtis, Geo. S., Co. .....Bulletin Bldg.
Spruce 4172
Curtis-Grindrod Co. .....Fuller Bldg.
Rittenhouse 5564
Curtis-Grindrod Co.
Louden & Carlisle St.
Wyoming 4947
Same ....Park Ave & Cumberland St.
Columbia 2530
Same .....1327 Mt. Vernon St.
Poplar 1281
Same .....1327 Mt. Vernon St.
Poplar 4073
Dading, Chas. H. ..Bellevue Court Bldg.
Pennypacker 2697
Dahl, Henry C. .....2105 Spruce St.
Locust 8259
Dahl, Henry C. .....231 S. 8th St.
Lombard 5860
D'Amico, Nicola & Son ..1622 S. 8th St.
Oregon 0370
Daniels, Frank .....212 N. 65th St.
Granite 4604
Davies, J. Jones .....641 N. 18th St.
Poplar 1946
Davis, E. Watson ....66th & Media Sts.
Belmont 4107
Decker, J. F. .....811 N. Taney St.
Poplar 1544
DeFilipo, John ....2937 N. Van Pelt St.
Columbia 0235

CONTRACTORS—Continued

Delise, Donato ....4842 N. Leithgow St. Michigan 1111
Della, Porta Matthew 5021 Wissahickon Ave. Germantown 8268
Demarest, Irving .....10 S. 18th St. Rittenhouse 4591
DeMase, Armond .....2027 S. 9th St. Oregon 7392
DePaul, John & Bros. 1262 E. Washington Lane Germantown 0712
De Renze, Michael ....6600 N. 17th St. Waverly 9735
DeVincentis, Chas. ....1313 S. Broad St. Oregon 2040
Same ....Bryn Mawr & Lebanon Aves. Belmont 9309
Devlin, J., Jr. Hancock & Thompson Sts. Regent 3776
Dewees Bros. Shelbourne & St. Vincent Aves. Fox Chase 0813
DiAntonio, Jas. ....425 N. Simpson St. Granite 7116
Di Domenico, Nicola ..1439 S. Broad St. Jackson 1331
DiFulvio, Ralph .....1422 Moore St. Oregon 2966
Di Gracomo, Toney ..3130 N. Judson St. Tioga 2773
DiMarco Bros. ....608 E. Wyoming Ave. Michigan 9200
DiRocco, Giulio .....1139 Mercy St. Jackson 6151
Disiato, Frank .....3802 N. 6th St. Wyoming 5150-W
Di Tommaso, N. & Co. 542 E. Haines St. Germantown 7374
Dobbin, George F. .....1020 S. 47th St. Woodland 1637
Dobbin, George F. fld. ofc. 25th & Annin Sts. Jackson 4928
Dolente, Louis .....5122 Master St. Belmont 8621
Domsgen, O. ....3029 Germantown Ave. Tioga 2878
Donato, Frank .....1411 S. 8th St. Jackson 0783
Donato, Frank .....1423 S. 8th St. Oregon 6474
Dougherty, Geo. C. ..2041 Moravian St. Locust 1372
Dougherty, Jas. ....3607 Fairmount Ave. Evergreen 2900
Doyle, Jas. M. .....3016 Chestnut St. Evergreen 5891

CONTRACTORS—Continued

Doyle & Company .....1519 Sansom St. Rittenhouse 4728 Race 6729
Dravo Contracting Co., The 34th St. & Schuylkill River Evergreen 7850
Duffin Bros. .....Penn & Womrath Sts. Delaware 4975
Duffin, John J. ..Penn & Womrath Sts. Delaware 4975
Durell, E. Clifford .....1713 N. 24th St. Stevenson 6247
Dyke, Herman A. ....219 Wendover St. Manayunk 3240
Eddleman, C. C. .....1627 Sansom St. Rittenhouse 9335
Elcock, Chas. ..Real Estate Trust Bldg. Pennypacker 8476
Ellis McCandless Co. ...2318 Sansom St. Rittenhouse 4820
Ellis, Peter & A. J., Inc. 4th St. bel. Wyoming Ave. Michigan 9779
Empire Constr. Co. .....2002 S. 12th St. Jackson 0647
Empire Const. Co. ....28th & Ritner Sts. Jackson 2424
Erny, Robert .....4718 N. 4th St. Wyoming 4221
Evans, George H., Inc. ....1416 Vine St. Rittenhouse 1523
Eyre, Harry H. Orthodox St. & Del. Rvr. Garfield 0129
Eyre-Johnston ..Commercial Trust Bldg. Rittenhouse 2148
Falcione, Domenick .....4765 Napfle St. Mayfair 2573
Farrell, James E. Commercial Trust Bldg. Rittenhouse 0168
Fay, Edward & Son .....5512 Vine St. Sherwood 7971
Federspiel, John .....1541 Ridge Ave. Poplar 9367
Feeney, John F. Str. yd. Nicetown Lane W. K St. Garfield 3554
Fernow Construction Co. ..Bulletin Bldg. Locust 3968
Field, Barker & Underwood, Inc. Commercial Trust Bldg. Rittenhouse 2677
Fiorini, Louis G. & Co. ..3018 N. 23d St. Columbia 2498
Foley, T. J., Co. Insurance Co. North American Bldg. Rittenhouse 2478
Foundation & Construction Co. 15th & Walnut Sts. Pennypacker 1053

CONTRACTORS—Continued

Fox, Jacob, R., Jr. .....1040 Bridge St.
Jefferson 3829
Freas, Walter .....9532 Bustleton Pike
Bustleton 8262
Fretz, A. L. & Son ....1213 Filbert St.
Locust 6393
Fry, Joseph W. .....5414 Thompson St.
Belmont 1465
Fuller, George A. .....8 S. 12th St.
Rittenhouse 2648
Fuller, George A., Co. ..25th & Green Sts.
Poplar 0240
Fuller, Geo. A., Co. Juniper & Filbert Sts.
Locust 6252
Futerman, B. R. ....429 W. Girard Ave.
Regent 5278
Galante, Albert V. ..38 W. Seymour St.
Germantown 5786
Galante, Philip .....38 W. Seymour St.
Germantown 5786
Gargeu, Joseph .....214 E. Haines St.
Germantown 6133
Garlick Bros. .....2948 E. Venango St.
Regent 6410 East 9079
Garrity, John F. .....750 S. Juniper St.
Pennypacker 3778
Geiss, John C. .....301 Green St.
Market 1200
General Construction Co.
1637 Porter St.
Jackson 6061
Gentile, Frank .....2051 Morris St.
Oregon 3545-J
Gentry, Wiley H. .....5417 Pine St.
Allegheny 1610
Gibbs, T. M. Construction Co., Inc.
Commercial Trust Bldg.
Rittenhouse 8670
Gibney, John L. ....5012 Woodbine Ave.
Overbrook 7182
Gill, Harry, Jr. ..2515 Germantown Ave.
Columbia 5566
Giordano, Vincenzo 1921 S. Iseminger St.
Oregon 6768
Glenn, Geo. A. ..Terminal Annex Bldg.
Locust 7313
Goeller, Peter .....1016 W. Cambria St.
Columbia 7632
Golden Contg. Co. ..5012 Woodbine Ave.
Overbrook 7182
Goldman, David ..9th & Buttonwood Sts.
Poplar 4327
Goldstein, Harry .....417 Lombard St.
Lombard 4416
Gorman & Frank ..Tioga & Amber Sts.
Delaware 9533
Goslin, John H. .....34 S. 16th St.
Rittenhouse 9878

CONTRACTORS—Continued

Gow Co., Inc. .....4501 Richmond St.
Jefferson 2090
Grady, Thos. P. .....3901 Cresson St.
Manayunk 9288
Graham-Chambley Co. ..3649 Filbert St.
Evergreen 4456
Graham, Wm. R. .....3649 Filbert St.
Evergreen 4456
Grindrod, Irvin S., Co. ....Fuller Bldg.
Rittenhouse 9416
Guarantee Realty Construction Co.
2524 W. Girard Ave.
Poplar 1214
Gucker, F. T. ..Real Estate Trust Bldg.
Pennypacker 3232
Gudknecht, J. B. ....6305 Torresdale Ave.
Mayfair 1245
Gudknecht & Cullison
6305 Torresdale Ave.
Mayfair 1245
Halbach, Philip Contracting Co.
Park Lincoln Drive & Cliveden Ave.
Victor 7243
Hambridge, Henry C. ....2101 S. 68th St.
Woodland 8862
Hammett, A. J. .....125 N. 18th St.
Rittenhouse 7809 Race 7172
Harad, Harry .....4942 C St.
Michigan 9232
Harris, John J., Constr. Co. ..Fox Bldg.
Rittenhouse 9083
Heebner, George K. .....1231 Vine St.
Spruce 5013
Henry & White ....6703 Torresdale Ave.
Mayfair 2435
Herzog, Joseph .....4314 York Rd.
Michigan 9564
Heyman & Goodman Co. 303 S. Broad St.
Pennypacker 6750
Higgins, Robt. F. Real Est. Trust Bldg.
Pennypacker 2469
Higgins & Reilly ..Real Estate Tr. Bldg.
Pennypacker 2469
Holburn, Thos. S. Capitol & Waverly Sts.
Locust 6699
Holburn & Stark Capitol & Waverly Sts.
Locust 6699
Hollenback, Edwin E., Inc.
1910 N. Marshall St.
Diamond 1278
Holloway, G. Thos. .....523 Ludlow St.
Lombard 8773
Holmesburg Concrete Co.
Welsh Rd. & Crispin St.
Holmesburg 1014
Hoover, F. L. & Sons 13th & Market Sts.
Locust 8458

CONTRACTORS—Continued

Hoover, F. L. & Sons, Inc.
1023 Cherry St.
Walnut 5180
Hoover, F. L. & Sons, Inc. fld. ofc.
Delaware Ave. & Allen St.
Garfield 2345
Hopple, H. A. .....Heed Bldg.
Rittenhouse 0624
Horridge, John ..Real Estate Tr. Bldg.
Pennypacker 8476
Horridge & Elcock ..Real Est. Tr. Bldg.
Pennypacker 8476
Horst, Henry W., Co.
State Rd. & Longshore St.
Mayfair 3050
Houseworth, Joseph E. ..2512 N. 27th St.
Columbia 6227
Humphreys, John A. ....226 Sumac St.
Manayunk 0225
Hunsperger, Inc. .....4510 N. 8th St.
Michigan 5464
Hunter-Shropshire, Inc.
Harrison N. Park Ave.
Majestic 3303
Hunter-Shropshire, Inc.
Peoples Bank & Trust Bldg.
Rittenhouse 4270
Ianscoli & Galantino ..122 N. Felton St.
Granite 1846
Iero, Domenick .....5101 F St.
Delaware 3381
Irvin, James .....26th & Moore Sts.
Oregon 7400
Irwin, Alexander D. .....Schaff Bldg.
Locust 4050
Irwin & Leighton
Broad & Mt Vernon Sts.
Poplar 1374
Irwin & Leighton ....N. American Bldg.
Pennypacker 0204
Irwin & Leighton .....Schaff Bldg.
Locust 4050
Jaffola & Mark, Inc. ..604 Lindley Ave.
Michigan 1451
Jafolla & Mark
Oxford Pike & Cranford Ave.
Delaware 4545
Jaffolla & Mark, Inc., 10th & Pollock Sts.
Jackson 6451
Jarka Corp. .....Phila. Bourse
Lombard 6756
Johnston, C. W. ....3250 Woodland Ave.
Evergreen 5733
Kaufman Constr. Co. ....26 S. 15th St.
Rittenhouse 0978
Kelly, C. F., Co. .....814 Walnut St.
Pennypacker 5742

CONTRACTORS—Continued

Kelly, Edward J. ....6317 Beechwood St.
Waverly 0641
Kelly, Hugh F. .....Widener Bldg.
Rittenhouse 9917 Race 7903
Kelly, James Constr. Co. ..Bulletin Bldg.
Locust 5846
Kelly, John B. .....2313 Walnut St.
Rittenhouse 8393
Kelly, P. H., Co., Inc. ..1713 Sansom St.
Rittenhouse 7278
Kennedy, Thos. & Son, 6742 N. Broad St.
Waverly 7148
Kessler, Chas. A. ..1733 N. Marvine St.
Stevenson 0700
Kessler, George Contracting Co.
1733 N. Marvine St.
Stevenson 0700
Kessler, Wm. L. ..1733 N. Marvine St.
Stevenson 0700
Keystone Paving & Contracting Co.
320 Richmond St.
Regent 4676
Keystone State Corp.
Filbert St. W. of 19th St.
Rittenhouse 9426
Keystone State Corp .Franklin Bk. Bldg.
Rittenhouse 9262
Killen, J. D. .....Liberty Bldg.
Locust 5256
King, M. H., Jr. ..Commercial Tr. Bldg.
Rittenhouse 0277
Kister, Alfred B. ....1204 Chancellor St.
Pennypacker 1777
Klenk, C. Russell .....515 W. Erie Ave.
Tioga 2274
Kline, Joseph H. & Son
2813 N. Marshall St.
Jackson 1220
Knotts, E. C. .....129 N. 51st St.
Granite 3734
Kober Construction Co. .Byberry Farms
Somerton 0531
Kober Construction Co. ..Byberry Farms
Somerton 0658
Kober Construction Co. ....34 S. 17th St.
Rittenhouse 4794
Koelle, Wm. F. & Co. .....1633 Race St.
Rittenhouse 6895
Krauss, A. .....3329 W. Huntingdon St.
Diamond 9491-W
Kuhn, Harry A. .....3642 Marvine St.
Michigan 3864
Kunzig, Henry J. .....127 Walnut St.
Lombard 2896
Lalumera, Michael ....7227 Vandike St.
Tacony 2206
Lam, Bldg. Co. .....1001 Wood St.
Walnut 1552

CONTRACTORS—Continued

Lam, Building Co. .....900 Chestnut St. Walnut 8288
Latta & Roberts .....Drexel Bldg. Lombard 0351
Lauer, John F. ....6217 Cobbs Cr. Pkwy. Granite 0909
Lauro, A. A. .....6107 Lambert St. Germantown 8348
Lee, Edmund .....647 N. 41st St. Evergreen 7573
Lee, Thomas P. .....5629 Cherry St. Granite 0379
LeFaucheur, Albert R. ..3649 Filbert St. Evergreen 4456
Leva Bros. .....104 W. Gale St. Waverly 9094
Levin, S. H. .....6174 Ridge Ave. Roxborough 9101
Lewis, S. Sidney.....121 N. Broad St. Locust 0109
Lindsay, Ellwood C. ....Harrison Bldg. Rittenhouse 9446
Lindsay, W. W. & Co. ....Harrison Bldg. Rittenhouse 9446
Linker, Benjamin .....212 S. 9th St. Walnut 7473
Linker, Wm. Co. .....735 Cherry St. Lombard 8106
Lombardi, Joseph .....Lincoln Bldg. Rittenhouse 4383
Lombardi, Jos. ..Richmond N. Bridge St. Delaware 4132
Lombardi, L & Bros. ....203 Wister St. Wyoming 8758
Lombardi, Louis .....203 Wister St. Wyoming 8758
Lombardi, Robert .....Lincoln Bldg. Rittenhouse 4383
Longstreth, Jos. Jr. .....424 Rhawn St. Fox Chase 1338
Lotz, Wm. F. Frankford & Oxford Aves. Jefferson 5815
Louchheim, Jerome H. Franklin Bank Bldg. Rittenhouse 9262
Loux, J. Y., Inc. 1501 W. Hunting Park Ave. Wyoming 4552
Lyster, John C. .....5035 Sansom St. Sherwood 7036
Macaro, Salvatore .....1831 Morris St. Jackson 1196
Mack Paving & Construction Co. Nicetown Lane & C. St. Regent 1240
MacTavish, Archibald, Inc. Capitol & Waverly Sts. Locust 6699

CONTRACTORS—Continued

Magee, John P. ....1129 N. Dunton St. Regent 7077
Manuel, W. N. ....4512 Woodland Ave. Woodland 3398
Marcolina Bros. ..133 E. Mermaid Lane Chestnut Hill 2252
Mariani, L. .....4801 N. Gransback St. Michigan 6595
Marino, Nick .....6215 Race St. Belmont 9288
Mark, F. W. Construction Co., Inc. Phila. Hospital Evergreen 1121
Mark, Frank Contracting Co. N St. & Wingohocking Ave. Jefferson 1800
Mark, Loui .....604 Lindley Ave. Michigan 1451
Marocchi, James .....1912 S. 12th St. Oregon 1029
Martin Contracting Co. Germantown Ave. & Durham St. Chestnut Hill 3270
Martin, Ralph S. .....1613 Sansom St. Rittenhouse 1554
Martin, Thomas S., 3d Germantown Ave. & Durham St. Chestnut Hill 3270
Martin & Breen, Inc. ....1613 Sansom St. Rittenhouse 1554
Mason & Hanger Co., Inc. Bath & Hedley Sts. Delaware 3438
Mason & Hanger Co., Inc. Bath W. Hedley St. Delaware 4140
Mauger, Herbert S. ..6906 Cedar Pk. Ave. Majestic 2439
Mazzola, Domenick ....1607 McKean St. Oregon 5178
Mazzola & Marano, Inc. ..739 S. 7th St. Lombard 7185
McBride, Wm. M. & Co. 1211 Walnut St. Pennypacker 3029 Race 6646
McCann, John & Son ....1808 Ludlow St. Rittenhouse 6897
McCarrick Bros. .....3240 Fox St. Tioga 8855
McClelland, D. A., Co. ....Drexel Bldg. Lombard 3777
McCleman, H. A. & Bro. 21st & Moyamensing Ave. Oregon 8942
McCleman, H. A. & Bro. 13th & Shunk Sts. Oregon 0190
McCormick, Geo. W. N. American Bldg. Pennypacker 5636

CONTRACTORS—Continued

McCormick-Lenham Co.
Broad & Tasker Sts.
Oregon 8893
McGovern, Patrick, Inc. ..Widener Bldg.
Rittenhouse 4233
McGrath, P. Jos. .....245 N. 16th St.
Spruce 2476
McGraw, James, Co.
Commercial Trust Bldg.
Rittenhouse 0168
McGuigan, Jas. J. 19th & Huntingdon Sts.
Columbia 7412
McHugh, Chas. A. ....892 N. Markoe St.
Belmont 9326
McHugh, J. Jos. .....1617 Race St.
Rittenhouse 5986 Race 7179
Same .....6900 Verbena St.
Majestic 3445
McHugh, M. & J. B.
8th St. & Glenwood Ave.
Tioga 7764
Same .....892 N. Markoe St.
Belmont 9326 West 2979
McHugh, M. & J. B. 33d St. & Girard Ave.
Poplar 2197
McLean, Contracting Co.
Pier 80, S. Wharves
Jackson 0451
McMenamin, M. J. ....Comrcl. Tr. Bldg.
Rittenhouse 2961
McNichol, P. & Sons ....1319 Quarry St.
Spruce 2094
Media Contracting Co. ..701 N. 66th St.
Belmont 4889
Mendenhall, Hayes & Son
1027 Drexel Bldg.
Lombard 3506
Mercaldo, A. & Sons ....616 Kimball St.
Lombard 5235
Mercaldo, Dominic .....616 Kimball St.
Lombard 5235
Mercaldo, James .....616 Kimball St.
Lombard 5235
Mercaldo, Vincent ....411 E. Locust Ave.
Germantown 7564
Messer, Geo. C. .....4820 Howell St.
Delaware 4245
Meyers, F. Guy, Co., Inc.
Commercial Trust Bldg.
Rittenhouse 3152
Mignone, Eugene .....4520 Meridian St.
Mayfair 2637
Miller, Allen O. ..6916 Cedar Park Ave.
Majestic 0793
Miller, Edward B. ..3935 N. Marshall St.
Michigan 8645
Monaghan, T. V., Inc. ..Widener Bldg.
Rittenhouse 4233

CONTRACTORS—Continued

Montgomery, M. W. ..1510 Chestnut St.
Rittenhouse 3676
Morrissey Bros. ....4336 N. Marshall St.
Wyoming 7832
Morrissy, Edward .....4345 N. 7th St.
Michigan 5470
Mullen, Edward A., Inc. ....5512 Vine St.
Sherwood 7971
Municipal Construction Co., Inc.
2d St. & Wingohocking Ave.
Wyoming 4403
Murphy, Howard M. ....4643 N. 9th St.
Michigan 5371
Murphy, Quigley & Co.
Westmoreland St. W. Fox St.
Tioga 9349
National Engineering & Cnstrctn Corp.
Fox Bldg.
Rittenhouse 0490
Neely, Daniel C. .....280 Lemonte St.
Roxborough 1280
Same .....16th & Latona Sts.
Jackson 5354
Nester, Wm. C. ....6211 Woodbine Ave.
Overbrook 2901
Niblick, William J.
Aubrey Ave. W. Ditman St.
Mayfair 2613-W
Nicholls, David J. & Co. .....3322 H St.
Regent 3187
Noetzel, H. A. .....129 N. 51st St.
Granite 3734
Nolen, J. F. & Sons ..64 E. Church Lane
Victor 3764
Northern Construction Co., Inc.
5th & Fishers St.
Michigan 3879
Northern Contg. Co. ..Greenwich Point
Oregon 0165
Northern Contracting Co.
West End Trust Bldg.
Rittenhouse 1286
Nusbaum, Elias & Bro. ..2023 Sansom St.
Rittenhouse 6484
Olmi, August & Bro. ..1530 S. 15th St.
Jackson 1104
O'Meara, Const. Co. ..228 S. Warnock St.
Pennypacker 0206
O'Neill, A. S. ....127 E. Mermaid Lane
Chestnut Hill 4475
O'Neill Bros. .....4525 N. 15th St.
Michigan 2967
O'Neill Co. .....127 E. Mermaid Lane
Chestnut Hill 4475
O'Neill, Frank F. ....9 E. Moreland Ave.
Chestnut Hill 0688
O'Neill, Wm. P. .....4525 N. 15th St.
Michigan 2967

CONTRACTORS—Continued

Orlando, L. .....5747 Vine St.
Sherwood 3662
O'Rourke, John ....5108 Wyalusing Ave.
Belmont 9063
P. R. T. Constr. Co. 11th & Pattison Sts.
Jackson 3498
Pagnacco, Arthur J. ..1427 Rockland St.
Wyoming 3890
Palm, Geo. W. .....4514 N. Front St.
Michigan 2911
Papaleo, Geo. .....1519 S. 15th St.
Oregon 3865
Pascuzzi, Emilio .....Lincoln Bldg.
Rittenhouse 4383
Pawling, Geo. F. ....1432 S. Penn Sq.
Rittenhouse 0565
Penn Disposal Co. .....1600 Arch St.
Rittenhouse 9569
Penn Foundation Co. ....1600 Arch Co.
Rittenhouse 9569
Penna. Engineering & Construction Co.
Real Estate Trust Bldg.
Pennypacker 2557
Penna. Engineering & Construction Co.
Real Estate Trust Bldg.
Pennypacker 1827
Perna, Alfonso & Son ....752 S. 10th St.
Pennypacker 3237
Perna, Jos. .....65th & Callowhill Sts.
Belmont 0653
Philadelphia Contracting & Bldg. Co.
1323 N. Marvine St.
Stevenson 1215
Phila. Sales Co. .....Bourse Bldg.
Lombard 9300
Phila. Steel & Wire Co.
25th & Tasker Sts.
Jackson 5386
Pietrykowski, S. ..3414-22 Richmond St.
Regent 6315
Pizzi, Achille .....5500 Girard Ave.
Allegheny 7027
Plumbers Roadway Breaking Co.
Dover & Somerset Sts.
Columbia 7654
Ponzio, Joseph .....1127 Dickinson St.
Oregon 5447
Porter, A. F. .....Fox Bldg.
Rittenhouse 3968
Porter-Gildersleeve Corp. ....Fox Bldg.
Rittenhouse 3968
Porter, James .....1429 Federal St.
Oregon 0517
Powlus, Jacob .....3001 N. Stillman St.
Diamond 3382
Progressive Engineering & Constr. Co.
5601 Germantown Ave.
Germantown 5685

CONTRACTORS—Continued

Purnell, Charles & Son ..922 S. 15th St.
Oregon 8754
Quaker City Contg. Co. ..136 S. 4th St.
Lombard 2543
Quinn, Jas. A. .....3531 Lancaster Ave.
Evergreen 3468
Radiant Specialty Co.
6208 Torresdale Ave.
Delaware 2832
Raff, A. Raymond, Co.
1635 W. Thompson St.
Stevenson 2216
Ramsdell Construction Co. ..6914 Mkt. St.
Allegheny 1674
Raymond Concrete Pile Co.
4501 Richmond St.
Jefferson 2090
Real Estate House Remodeling Co.
6016 Haverford Ave.
Granite 9694
Redd, Geo. .....5561 Baynton St.
Victor 5109
Regan, Thomas J. .....Schaff Bldg.
Rittenhouse 9691 Race 6684
Reilly, James F. ..Real Estate Tr. Bldg.
Pennypacker 2469
Reilly, T. F. .....50th St. & City Line
Overbrook 1587
Richards-Kelly Co. .....Widener Bldg.
Rittenhouse 9917
Richardson & Co. .....136 S. 4th St.
Lombard 2128 Race 7903
Richmond Contracting Co.
847 N. 21st St.
Poplar 3927
Riley, James & Son
Forrest Ave. N. Johnson St.
Majestic 2369
Rinaldi, Pietro .....1146 S. 8th St.
Jackson 1031
Robbins Contracting Co. 1137 N. Front St.
Regent 4580
Robbins, Samuel .....1137 N. Front St.
Regent 4580
Roberts, J. K. .....Drexel Bldg.
Lombard 0351
Roberts & Roller .....1700 Walnut St.
Pennypacker 4066
Rocco, Joseph .....1825 S. 8th St.
Jackson 0322
Rochelle, N. H. Mascher & Wellens Aves.
Wyoming 4924
Rosen, D. .....533 Pine St.
Lombard 6283
Rotko, Ben .....916 Snyder Ave.
Oregon 5914
Rotzell, S. C. ..Haines & Limekiln Pike
Majestic 1741

CONTRACTORS—Continued

Royal Home Improvement Co.
52 N. 60th St.
Granite 3163
Rubin, Laib .....421 Jackson St.
Jackson 1451
Rust, Harry R., Inc. ....724 Ludlow St.
Lombard 6877
Ruth, Allen W. ....4512 Woodland Ave.
Woodland 3398
Ryan Construction Co.
Real Estate Trust Bldg.
Pennypacker 1075
Ryan, James J. .....Pennsylvania Bldg.
Spruce 1262
Ryder, John J. .....16th & Louden Sts.
Wyoming 10008
Salvato, Gaetano ..2211 W. Toronto St.
Columbia 6326
Salvucci, Frank .....752 Johnston St.
Jackson 6283
Savidge, Edwin T., Co. ..2812 N. 23d St.
Columbia 6824
Savine, Dominick ..57th & Florence Ave.
Woodland 2226
Scarcia Bros. & Co. ....2078 Margaret St.
Jefferson 2478
Schaffner, William .....1215 Nedro St.
Waverly 5594
Schestack, H. .....2524 W. Girard Ave.
Poplar 1214
Schilling, Frank .....607 Alcott St.
Fox Chase 9911
Schoeller, Andrew .....Heed Bldg.
Rittenhouse 0624
Seaboard Construction Co.
Real Estate Trust Bldg.
Pennypacker 3232
Seeds & Derham ..Green Lane Bridge St.
Manayunk 0457
Seeds & Derham ..Sumac & Ridge Ave.
Manayunk 0435
Seeds & Derham ..6320 Wissahickon Ave.
Germantown 0544
Shoop, William O. ....219 N. Wilton St.
Granite 7397
Siciliano, Antonio .....1417 S. 22d St.
Oregon 4760
Sievers E. A. ....3712 N. Sydenham Ave.
Michigan 6142
Simms & Co. .....2313 Walnut St.
Rittenhouse 3548
Sims, S. A. & Co. ....2313 Walnut St.
Rittenhouse 3548 Race 1998
Sinclair & Grigg
26th St. & Washington Ave.
Oregon 8081
Smidt, Frank .....2 E. Wister St.
Wyoming 7146

CONTRACTORS—Continued

Snare, Frederick Corp.
Richmond & Wheatsheaf Sts.
Garfield 2968
Snyder, George F. ....3200 Sansom St.
Evergreen 4422
Snyder, George F. .....1737 Filbert St.
Rittenhouse 2433
Snyder, W. B. .....824 Perkiomen St.
Poplar 8588-J
Soabar Co. .....5815 Erdrick St.
Delaware 2175
Sorensen, P. A. .....1133 Callowhill St.
Walnut 0643
Sorrentino, Michael ....921 Catharine St.
Pennypacker 0798
Spagna-Rodrock ..Peoples Trust Bldg.
Rittenhouse 0814
Spaltro, John .....6205 Girard Ave.
Granite 6714
Spaltro, John & Son ....6205 Girard Ave.
Granite 6714
Stange Construction Co. ..1600 Arch St.
Rittenhouse 9569
Stark, Lyman B. ..Capitol & Waverly Sts.
Locust 6699
Stavola, Gaetano ....1438 S. Bancroft St.
Oregon 8988-J
Steele, Wm. & Sons Co.
20th & Hamilton Sts.
Poplar 1816
Steele, Wm. & Sons Co. ..124 N. 15th St.
Spruce 0266
Stokes Brothers .....6723 Musgrave St.
Germantown 0294
Stone & Webster, Inc., fld. ofc.
1017 Walnut St.
Pennypacker 9387
Stone & Webster, Inc., inspection dept.
Real Estate Trust Bldg.
Pennypacker 1768
Strachan, Thos. .....5108 Hadfield St.
Allegheny 6117
Sutter, H. C. .....1706 N. 55th St.
Belmont 4216
Sykes, John B. .....237 N. 13th St.
Spruce 1776
Tallman, Anderson Co. ..1713 Sansom St
Rittenhouse 7388 Race 1446
Terry, J. H. & Co. .....Drexel Bldg.
Lombard 0400
Terry, J. Hermon .....Drexel Bldg.
Lombard 0400
Torrese, Philip .....1528 Wolf St.
Oregon 8262
Townsend, Schroeder & Wood, Inc.
Drexel Bldg.
Lombard 1090

CONTRACTORS—Continued

Triest Contracting Corp.
Real Estate Trust Bldg.
Pennypacker 4543
Trimble Bros. .....D & Erie Ave.
Regent 2815
Turnbull, Paul H.....15 S. 21st St.
Rittenhouse 7959
Turner Construction Co.,
17th & Walnut Sts.
Pennypacker 1901
Tylar, Harrison R.
452 W. Mt. Pleasant Ave.
Chestnut Hill 1393
U. G. I. Contracting Co., fld. ofc.
6731 Elmwood Ave.
Woodland 8518
Union Electric Contracting Co.
2318 Sansom St.
Rittenhouse 4820
Union Foundation Co.,
North American Bldg.
Pennypacker 5636
United Master Mechanics 6209 Market St.
Granite 9594
Unkefer Bros. Construction Co., Inc.,
2313 Walnut St.
Rittenhouse 3615
Vare Construction Co. ....1120 Race St.
Walnut 5514
Vassallo, Jos. .....203 W. Clapier St.
Wyoming 5088-J
Vecchiolli, Daniel .....2035 Ritner St.
Oregon 1085
Vecchiolli, Donato .....2035 Ritner St.
Oregon 1085
Vianale, Fiorindo .....1316 S. 13th St.
Jackson 6248
Visco, Jas. .....3418 N. 11th St.
Tioga 6467
Walsh Bros. .....4618 Van Kirk St.
Delaware 1759
Wark Co. .....1600 Walnut St.
Pennypacker 4121 Race 7821
Warren, F. V. Co. 29th & Allegheny Ave.
Columbia 6574
Warshavsky, David..812 N. Marshall St.
Market 0218
Weatherite Caulking Co.,
3712 N. Sydenham St.
Michigan 6142
Wehmeyer, Edwin W. ..1700 Walnut St.
Pennypacker 4207
Weinerman, Albert..6016 Haverford Ave.
Granite 9694
Wenner, R. B. .....2819 Gordon St.
Columbia 6414

CONTRACTORS—Continued

Western Stevedoring Co.,
West End Trust Bldg.
Rittenhouse 4619
Wetter, Chas. G. ..Stock Exchange Bldg.
Rittenhouse 9027
White Construction Co., Inc.,
Jefferson Bldg.
Walnut 8740
White, Geo. M. ....6703 Torresdale Ave.
Mayfair 2435
White, J. P. Co. ..Jenks & Garden Sts.
Delaware 1826
Whiteside, Rush J. & Sons
2115 Wallace St.
Poplar 2302
Wholey, D. F. ....1109 W. Indiana St.
Columbia 3115
Wickersham, John H.
Bustleton Pike S. Reading St.
Somerton 8277
Williams, B. Co. .....1824 N. 22d St.
Stevenson 0811
Williams, Jas. 222 E. Willow Grove Ave.
Chestnut Hill 1466
Williams, Jos. P. .....Packard Bldg.
Rittenhouse 3666
Wills, Bill & Co. .....1708 Sansom St.
Rittenhouse 9544 Race 6614
Wilson-Martin, Inc. ..2d & Jefferson Sts.
Regent 1997
Wintz Bros. .....1616 Sellers St.
Jefferson 0432
Wintz, Frank I., Inc. ....1618 N. 27th St.
Stevenson 5200
Woodoth, David F. .....132 N. 3d St.
Market 0958
Wright, George C. .....6066 Ridge Ave.
Roxborough 1732
Yacknitz, Morris ..4544 N. Warnock St.
Michigan 8380
Yarnall, Ernest R. .....925 Walnut St.
Pennypacker 0191
Yarrow, H. C., Jr. .....10 S. 18th St.
Rittenhouse 7360
Yetman, W. H. .. ..Tioga & Salmon Sts.
Nebraska 8653
Yetman, Wm. H., Jr. ....Lincoln Bldg.
Rittenhouse 4383
Zarch & Fisher ..Real Estate Trust Bldg.
Pennypacker 1881
Zarch & Fisher fld. ofc.
58th St. & Cobbs Creek Parkway
Sherwood 9625
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150
Zito Gaetano & Son ....1426 Widener Pl.
Waverly 4917

CONSTRUCTION REPORTS
(See Building Construction Reports)

CONSULTING ENGINEERS
(See Engineers—Consulting)

CONTRACTORS—BRICKLAYING CONTRACTORS

D'Amico, Nicola, & Son ..1622 S. 8th St.
Oregon 0370 Main 9868
Erny, Robert .....4718 N. 4th St.
Wyoming 4221
Leary, Lawrence A. ....Land Title Bldg.
Rittenhouse 9135
Taylor, W. H. Harrison
2220 Mt. Vernon St.
Poplar 1177
White Contracting Corp.
2030 Upland Way
Belmont 4367
Kelly, John B., Inc. .....2313 Walnut St.
Rittenhouse 8393 Race 1992
Hymowitz & Sons .....317 S. 6th St.
Lombard 6398 Main 2248

CONTRACTORS—BUILDING CONTRACTORS

Collins Const. Co. .....1501 Arch St.
Rittenhouse 6742 Race 1300
(See advertisement page 62)
Lotz, Wm. F. ..Oxford Bank Bldg. Fkd.
Jefferson 5815 East 7730
(See advertisement page 52)

CONTRACTORS—CONCRETE CONTRACTORS

Colen, P. M. .....2603 Poplar St.
Poplar 0536 Race 5626
(See advertisement page 22)
Drehmann Paving & Const. Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 44)
Carter Paving Co.
50th St. & Lancaster Ave.
Belmont 6197 West 1541
Central Concrete Construction Co.
1622 North American Bldg.
Pennypacker 8861
Cassiah, Frederick .....1342 Cypress St.
Pennypacker 4165 Race 3760
Cowlus, Jacob O. ...3001 N. Stillman St.
Diamond 3382
Deuter, P. N. .....1043 W. Venango St.
Tioga 8693-W

CONTRACTORS—CUT STONE CONTRACTORS

Butler & Orlando .....5747 Vine St.
Sherwood 3662
(See advertisement page 300)
Down's, McKinley, Stone Quarries
6806 York Rd.
Waverly 1870
Guerrina, Alex .....6802 Chew St.
Germantown 3305
Media Contracting Co.
701 N. 66th St.
Belmont 4889
Midoro, James ....2321 W. Clearfield St.
Diamond 6563-W
Mullen, Edw. A., Inc. .....5512 Vine St.
Sherwood 7971 West 1953

CONTRACTORS—ELECTRICAL CONTRACTORS

Althofer Elec. Shop .....5323 Gtn. Ave.
Germantown 0815
Arnold, M. E., & Co. ....1019 Cherry St.
Walnut 6612 Race 5261
Brockmeyer & Fitzgerald .3410 N. 22d St.
Tioga 2697
Brudenell, Norman ..2123 W. Pacific St.
Tioga 8449
Buchanan, W. B., & Son ..127 Walnut St.
Lombard 1011 Main 4210
Burns, Eugene V. .....5105 Gtn. Ave.
Michigan 8240
Cavello, Anthony .....1434 Snyder Ave.
Oregon 7053
Central Wiring & Repair Shop
1024 Arch St.
Walnut 3528
Collmer, E. B. ..4130 Germantown Ave.
Michigan 9072
Courtney, Frank K. .....5104 Gtn. Ave.
Germantown 7728 North 0089
Crawford, Chas. H. .....2348 N. 15th St.
Columbia 9269
Cummings Electric Co...1620 Foulkrod St.
Delaware 3616 East 8263
Diem, Clarence W.
7002 Cedar Park Ave.
Majestic 3128
Dougherty, J. F. .....5727 Chester Ave.
Woodland 2214
Eidlows Electric Shop
5518 Chester Ave.
Woodland 2640 West 2636
Electro Const. Co. ....Comrcl. Tr. Bldg.
Rittenhouse 2628 Race 1339
Engle, A. H. .....1816 Fairmount Ave.
Poplar 0529 Race 2003
Engel, Henry, & Sons ..2313 Wallace St.
Poplar 4904 Race 3138

CONTRACTORS—ELECTRICAL CONTRACTORS—Continued

Fitch, Reed M. .....5110 Walnut St.
Granite 3273
Foley, Howard P., Co. ....34 S. 17th St.
Rittenhouse 4957 Race 1587
Frazer, H. B., & Co. .....250 N. 11th St.
Walnut 3975 Race 5602
Freeman Electric Co.
2023 W. Lehigh Ave.
Columbia 5674
Friel, Jos. V. .....1325 Vine St.
Locust 4291 Race 3996
Ganister, Edw. .....3746 N. 5th St.
Tioga 8411 Park 2119
Gatens, John .....2614 N. 23d St.
Columbia 4993
Gentel, Albert, Inc. .....4445 Gtn. Ave.
Michigan 6969 North 0486
Grass, Samuel A. .....2319 N. 7th St.
Columbia 5511
Griffith, A. M. .....50 N. 52d St.
Granite 5557
Gross, Jacob .....16 Queen Lane
Germantown 6382
Guest, Edw. .....5637 Windsor Ave.
Woodland 6175-J
Hamilton, Samuel H. ....6662 Gtn. Ave.
Germantown 2714
Home Electric Shop ....7208 Gtn. Ave.
Chestnut Hill 3366
Independent Wiring Co., Inc.
1613 Sansom St.
Rittenhouse 4839 Race 7103
Industrial Manufacturing & Electric Co.
416 N. Orianna St.
Market 2738 Main 6059
Jaeger, Wm. R. ....257 W. Rockland St.
Michigan 5607
Jellett, Stewart A., Co. ...1200 Locust St.
Pennypacker 8992
Jones, C. Brooke .....106 Levering St.
Manayunk 1797 North 0145
Kersting Electric Co.
1509 W. Susquehanna Ave.
Columbia 5112 Park 3338
Kester, Chas. W. .....3038 W. York St.
Columbia 7559 Park 1362
Keystone Electric Co. ....907 Walnut St.
Pennypacker 7735 Main 6802
Kyle, B. T. & Co. ..16th & Master Sts.
Stevenson 7149 Park 1538
Levengood, Charles B. ..926 Sansom St.
Pennypacker 8653 Main 6210
Lewis & Lamont ..644 E. Allegheny Ave.
Regent 1124 East 9046
Loveland, Wm. A., Inc. ..2014 Sansom St.
Rittenhouse 1795

CONTRACTORS—ELECTRICAL CONTRACTORS—Continued

Lucas, Fred J. .....244 W. Orange St.
Waverly 9863
McCarthy, Chas. F. ..5661 Blakemore St.
Victor 7011
McCausland, Wm. J., Co. 5346 Addison St.
Granite 7546
McClay Electric Co. .....19 S. 13th St.
Spruce 3392
Mehan, Andrew, Co .....209 Race St.
Market 0110 Main 2686
Messner, Chas. W. ....3704 N. Broad St.
Michigan 4407
Middleton, John B. .....77 Herman St.
Germantown 1471
Miller, Jos. S. Electric Construction Co.
219 N. Broad St.
Spruce 5482 Race 2748
Mulhern, Chas. J. & Co. ..1735 Francis St.
Poplar 3157 Race 4567
Nash W. Harwood ..5422 Christian St.
Granite 6963
Nation Electric Co. ..2002 E. Cambria St.
Regent 5575
Northern Electric Co.
1309 W. Venango St.
Tioga 4471
Oswald, Harry H.
1434 W. Susquehanna Ave.
Columbia 6931
Overbrook Electric Shop
2013 N. 63d St.
Overbrook 8213
Pangborne, W. V. & Co.
1927 W. Montgomery Ave.
Stevenson 7877 Park 2781
Point Breeze Electric Co.
1260 Point Breeze Ave.
Jackson 5418 Race 3166
Pollock, Herman .....4634 N. 5th St.
Wyoming 4101
Robinson Electrical Co., Inc.
809 Race St.
Walnut 1869 Main 3958
Rumer, C. M. .....2246 N. 29th St.
Columbia 6057
Ryan, J. J. .....2405 W. Lehigh Ave.
Columbia 3596
Schaefer, R. C. ..29th St. & Lehigh Ave.
Diamond 2313
Schaffner, Wm. .....1215 Nedro St.
Waverly 5594
Schuck, Electric Co. .....5946 Gtn. Ave.
Germantown 2934
Schwartz, Wm. P. ..252 S. Van Pelt Ave.
Locust 1058 Race 2961
Shore Electric Service ..2444 N. 16th St.
Columbia 8725

CONTRACTORS—ELECTRICAL CONTRACTORS—Continued

omerset Electrical Co.
Trenton Ave. & Somerset Sts.
Regent 4152
tamper, Wm. L. ....5622 Malcolm St.
Woodland 6583
tuhlmuller, Harry A.
Broad St. & Rising Sun Ave.
Tioga 4559 Park 1620
aylor & Beiler .....12 S. 20th St.
Rittenhouse 5869
ioga Electrical Fixture Co.
3245 N. Front St.
Regent 5566 Park 2489
ricker, Wm. J. ....6540 Woodland Ave.
Woodland 3371
win State Electric Co.
307 Christian St.
Lombard 4641
nion Electric Contracting Co.
2318 Sansom St.
Rittenhouse 4820 Race 1976
right, Robert J. .....2315 Walnut St.
Rittenhouse 1869 Race 7563
erkes & Lewis ..1306 W. Rushcomb St.
Wyoming 5763

CONTRACTORS—HEATING CONTRACTORS

lexander, W. A. C. ..5002 Willows Ave.
Allegheny 2891
llen Plumbing & Heating Co., Inc.
211 N. Paxon St.
Granite 8143
ltman, H. .....532 Dickson St.
Jackson 3671
merican Heating Co. ....Drexel Bldg.
Lombard 1708
merican Sheet Metal Works
6350 Greenway Ave.
Woodland 0801
rmbrust & McGurk 4531 Baltimore Ave.
Woodland 1505 West 1011
aierle, Albert A. ..643 E. Clementine St.
Regent 9758
aral Hardware & Heating Co.
1022 Columbia Ave.
Stevenson 4620 Park 3825
ecker, H. A. ....2222 Frankford Ave.
Regent 6061
enditt, Hummel & Co.
1464 N. Frazier St.
Allegheny 1564
nnet, A. B., Co. 1632 W. Thompson St.
Stevenson 4381

CONTRACTORS—HEATING CONTRACTORS—Continued

Bevilacqua, M. .....2140 S. 10th St.
Jackson 4360
Bowers Bros. & Co. ....2015 Sansom St.
Rittenhouse 9322 Race 5439
Breen, John A., Jr. ..661 E. Thayer St.
Garfield 2888
Bryan, M. & Son .....919 N. 7th St.
Market 2758
Bunn, Geo. L. .....1740 N. 27th St.
Stevenson 6244
Conrad, F. D. .....2208 Snyder Ave.
Oregon 1893 Race 2064
Copperman, Harry B. ....618 S. 6th St.
Lombard 1757 Main 3476
Dempsey, Thos. F. ..7223 Woodland Ave.
Woodland 0794
Donovan, Wm. J. ..1635 Brandywine St.
Poplar 8745 Race 6157
Dooley, Jas. J. .....1529 S. 52d St.
Woodland 9209
Dubois, John A. .....1326 W. Tioga St.
Tioga 7494 Park 3151
Dussinger, M. F. .....5300 N. Front St.
Garfield 3846
Eagle Sheet Metal Works
2924 W. York St.
Columbia 6905
English, Irvin H. ..1831 Brandywine St.
Poplar 4687
Feeney, M. J. ..62d & Lansdowne Ave.
Belmont 4124 West 3025
Fine, S. E. .....5426 Market St.
Allegheny 3062
Foulds, Thos. S. .....4622 Sansom St.
Sherwood 4776
Freeman, Wm. .....2407 S. 10th St.
Oregon 9271
Gadsby, Howard V. ....3039 Fkd. Ave.
Regent 5605
Garraty, Jos. F. & Son ....736 N. 63d St.
Belmont 7015
Garrett, Geo. N. .....543 N. 8th St.
Market 2424
General Home Improvement Co., Inc.
237 N. 13th St.
Spruce 1776 Race 3814
Gerbrick & Kaufman
American & Filbert Sts.
Market 6531 Main 7505
Golbert, Edward R. .....6020 Spruce St.
Sherwood 0498
Goldner, Herman, Co., Inc
425 W. Lehigh Ave.
Regent 3863 Park 5313
Gorges, Wm. S.
1919 W. Susquehanna Ave.
Columbia 6020

CONTRACTORS—HEATING CONTRACTORS—Continued

Haines, Geo. W. ..17th & Catharine Sts. Oregon 5936 Race 1010
Haines, Wm. S. & Co. 12th & Buttonwood Sts. Poplar 1490
Hallinan, James F. .....5218 Vine St. Sherwood 9300 West 1915
Hewitt, Frederick M. ..1700 Church St. Jefferson 8044
Hoben, Robert J. ....258 S. Van Pelt St. Spruce 2587 Race 5654
Hoover, A. J. .....2804 Emerald St. Garfield 2377
Hopkin, C. E., Co. ..107 Bethlehem Pike Chestnut Hill 0114
Horn, Benj. F. .....28 N. 5th St. Lombard 8866
Hyman, Jack M. ....3017 N. Croskey St. Diamond 5202
Jay, S. & Son .....1528 S. 5th St. Jackson 0658
Jellett, Stewart A., Co. ..1200 Locust St. Pennypacker 8992
Jerman, James M. ..162 E. Chelten Ave. Germantown 2606
Joerger, A. L., Son .....610 N. 3d St. Market 2996
John, Benjamin F., Co. ....1003 Race St. Walnut 5680 Race 5572
Kanterman, Samuel .....37 N. 58th St. Granite 3009
Kenna, John .....5605 Market St. Sherwood 6677
Kenneck, Fred ....5418 Lansdowne Ave. Belmont 1709
Kerr, John A. .....430 N. 61st St. Granite 0571
Kisterbock, J. & Son ....1342 Ridge Ave. Poplar 2500 Race 7178
Lowden, H. C. .....3939 Ludlow St. Evergreen 3407
MacFarlane, J. ..433 E. Allegheny Ave. Regent 9797
MacGuire & Kilgannon ..618 S. Broad St. Oregon 5901
Major, Robert .....4309 Locust St. Evergreen 4207
Matthias, Joseph E. .....639 N. 52d St. Belmont 3330
Mayberry, Wm. U. .....524 Walnut St. Lombard 2212 Main 4237
McCarthy, Chas. J. .....Otis Bldg. Rittenhouse 5357 Race 4583
McColgan, Jerome ....2425 E. Ann St. Regent 8624

CONTRACTORS—HEATING CONTRACTORS—Continued

McCoy, Charles E., Co. ..18 N. 19th St. Locust 2164
McElwee, Hugh & Sons Coral & Huntingdon Sts. Regent 6773 East 8620
McFall, J. T. & Son ..4810 Chester Ave. Woodland 0647
Mervine Bros. .....616 N. 5th St. Market 2791 Main 7577
Modern Plumbing & Heating Co. 3621 Market St. Evergreen 1964
Mort Supply Co. ..4th St. & Girard Ave. Market 4426 Park 4923
Nuench, Walter W. .....2134 Cherry St. Rittenhouse 7790 Race 5145
Osmond, J. H. .....612 Race St. Market 1979 Main 6138
Owens & Phillips ..1036 S. Frazier St. Sherwood 5727
Peale, Clifton .....1735 Sansom St. Rittenhouse 3787
Peters, W. Adolph ..2838 W. Lehigh Ave. Diamond 0614
Phila. Home Improvement Co. 4316 Lancaster Ave. Evergreen 2143
Raid, Walter .....4134 N. Franklin St. Michigan 3800
Rees, Christian ....251 W. Sedgley St. Garfield 0634
Sabin, Edward P., Co. ..4710 Market St. Granite 1171 West 3438
Savage, Wm. T. .....2104 N. 6th St. Columbia 1214
Schwartz & Leib .....243 S. 60th St. Sherwood 1440 West 2444
Shea, James A. .....1748 N. 61st St. Belmont 7518
Smith, John P., Inc. .....138 N. 7th St. Lombard 0861 Main 7594
Smith, Joseph A. .....5134 Spruce St. Granite 0617
Soehle, James .....3145 N. 15th St. Tioga 4664
Stillwell, Hary L. ..13th & Windrim Sts. Michigan 1941
Thompson Bros. ....520 Buttonwood St. Market 0254 Main 2754
Toy, Frank D. & Son ....55 N. 10th St. Walnut 0463
Valiante, Tony .....1931 S. 13th St. Oregon 5013
Wackenhut, F. G. ..2416 Frankford Ave. Regent 8214

CONTRACTORS—HEATING CONTRACTORS—Continued

/agner, Albert C. ..308 Summerville Ave.
Waverly 2141
/alters, Wm. H. & Sons
1314 N. Carlisle St.
Stevenson 8539 Park 3016
/eiss Bros. Electric & Heating Co.
2423 N. 29th St.
Columbia 8023
/instead, Edward D. ....38 N. Ruby St.
Sherwood 7621

CONTRACTORS—LANDSCAPE CONTRACTORS

arrison, Mertz & Emlen, Inc.
1713 Sansom St.
Rittenhouse 7244 Race 7645
lorse & Morse .....1524 Chestnut St.
Rittenhouse 5539 Race 5522

CONTRACTORS—MASONRY CONTRACTORS

utler & Orlando .....5747 Vine St.
Sherwood 3662
(See advertisement page 300)
own's, McKinley Stone Quarries
6806 York Rd.
Waverly 1870
uerrina, Alex. .....6802 Chew St.
Germantown 3305
edia Contracting Co. ..701 N. 66th St.
Belmont 4889
idora, James ..2321 W. Clearfield St.
Diamond 6563-W
olmesburg Concrete Co.
/elsh Rd. & Crispen St. Holmesburg, Pa.
Holmesburg 1014
elix, Cantana & Bro. ....1720 Cayuga St.
Michigan 6366
avis & Savine .....23 S. 52d St.
Stevenson 3186

CONTRACTORS—METAL LATH CONTRACTORS

)stwick Steel Lath Co.
2324 Callowhill St.
Locust 0956 Race 5566
emmer, Solomon .....5712 N. 12th St.
Waverly 1171
)nnor, John L. .....Schaff Bldg.
Rittenhouse 6957 Race 6034
atz, Geo. & Co. ..2502 W. Harold St.
Columbia 8477 Park 5017

CONTRACTORS—METAL LATH CONTRACTORS—Continued

Raynor, John S. ....2300 E. Lehigh Ave.
Regent 0391
Venzie, F. M. & Co.
2610 W. Huntingdon St.
Columbia 8908 Park 5317

CONTRACTORS—STEAM SHOVEL CONTRACTORS

Butler & Orlando .....5747 Vine St.
Sherwood 3662
(See advertisement page 300)
Ballinger & Dougherty
Kensington Ave. & Airdrie St.
Jefferson 9040
Davis & Savine .....23 S. 52d St.
Sherwood 3186
Hunter's Sons, Jos. ..2416 Richmond St.
Regent 2144
Lynch, John J. .....1006 S. 60th St.
Allegheny 0872
McDevitt, John F. .....1403 N. 20th St.
Poplar 3816
Morrissey Bros. ....4336 N. Marshall St.
Wyoming 7832
General Contracting Co. ..2101 S. 68th St.
Woodland 8862

CONTRACTORS—PLUMBING CONTRACTORS

Alexander, W. A. C. ..5002 Willows Ave.
Allegheny 2891
Alexander, Wm. H. .....5553 Spruce St.
Allegheny 2469
Allen Plumbing & Heating Co.
211 N. Paxon St.
Granite 8143
Allston, Chas. V. .....521 N. 20th St.
Poplar 1408
Armbrust & McGurk 4531 Baltimore Ave.
Woodland 1505 West 1011
Baierle, Albert A. 643 E. Clementine St.
Regent 9758
Boen & Sample, Inc. ..3008 Ludlow St.
Evergreen 7885 West 1997
Becker, Howard A. .....2222 Fkd. Ave.
Regent 6061
Bielfuss, Harry .....438 E. Louden St.
Michigan 1617
Bishop, A. L. .....241 E. Bringhurst St.
Wyoming 7783-J

CONTRACTORS—PLUMBING CONTRACTORS—Continued

Bryan, M. & Son .....919 N. 7th St.
Same .....322 N. 6th St.
Market 2758
Bunn, Geo. L. .....1740 N. 27th St.
Stevenson 6244
Conard, F. D. .....2208 Snyder Ave.
Oregon 1893
Coppola, Gregory P. ..4423 N. 18th St.
Wyoming 8455
Cuff, John R. .....7021 Upland St.
Woodland 3751
Dempsey, Thos. F. ..7223 Woodland Ave.
Woodland 0794
Devine, Frank .....2642 N. 26th St.
Columbia 6534
Donovan, Wm. J. ..1635 Brandywine St.
Poplar 8745
Dooley, Jas. J. .....1529 S. 52d St.
Woodland 9209
Dougherty, Frank P.
Passyunk Ave. & Juniper St.
Oregon 0436
DuBois, John A. ....1320 W. Tioga St.
Tioga 7494 Park 3151
Eisemann, Conrad D. ..5233 Oxford Ave.
Delaware 1640 East 8180
England, Geo. W. .....235 S. 5th St.
Lombard 2955
English, Irvin H. ..1831 Brandywine St.
Poplar 4687 Race 1319
Farley, James ....5422 Wyalusing Ave.
Allegheny 4470
Feeney, Maney J. ..62d &Lansdowne Ave.
Belmont 4124 West 3025
Fine, S. E. .....5426 Market St.
Allegheny 3062
Foulds, Thos. S. .....4622 Sansom St.
Sherwood 4776
Gadsby, Howard V. ....3039 Fkd. Ave.
Regent 5605
Gobert, Edward R. .....6020 Spruce St.
Sherwood 0498
Goldner, Herman Co., Inc.
425 W. Lehigh Ave.
Regent 3863 Park 5313
Gorges, W. S. 1919 W. Susquehanna Ave.
Columbia 6020
Grossman, Benjamin S. ..604 S. 10th St.
Pennypacker 2442
Gunzer, Frederick ....5526 Girard Ave.
Allegheny 4616
Hallinan, James F. .....5218 Vine St.
Sherwood 9300 West 1915
Helgenberg, Howard F.
2032 E. William St.
Regent 5945

CONTRACTORS—PLUMBING CONTRACTORS—Continued

Hoben, Robert J. ..258 S. Van Pelt St.
Spruce 2587 Race 5654
Horn, Benj. F. .....28 N. 5th St.
Lombard 8866
Hyman, Jack M. ....2544 N. Douglas St.
Diamond 8858-J
Same .....3017 N. Croskey St.
Diamond 5202
Jerman, James M. ..162 E. Chelten Ave.
Germantown 3606
Joerger, A. L., Son .....610 N. 3d St.
Market 2996
Kanterman, Samuel .....37 N. 58th St.
Granite 3009
Kenna, John .....5605 Market St.
Sherwood 6677
Kenneck, Fred. ..5418 Lansdowne Ave.
Belmont 1709
Kerr, John A. .....430 N. 61st St.
Granite 0571
Krajeski, Henry ....5857 Fernwood Ave.
Allegheny 3176
Schwartz & Leib .....243 S. 60th St.
Sherwood 1440 West 2444
Macfarlane, Jas. ..433 E. Allegheny Ave.
Regent 9797
MacGuire & Kilgannon ..618 S. Broad St.
Oregon 5901
Major, Robert .....4309 Locust St.
Evergreen 4207
Mayberry, Wm. U. .....524 Walnut St.
Lombard 2212 Main 4237
McCarthy, Chas. J. .....Otis Bldg.
Rittenhouse 5357 Race 4583
McColgan, Jerome .....2425 E. Ann St.
Regent 8624
McCoy, Chas. E., Co. ....18 N. 19th St.
Locust 2164
McElwee, Hugh & Sons
Coral & Huntingdon Sts.
Regent 6773 East 8620
McFall, John T. & Son 4810 Chester Ave.
Woodland 0647
McMonigal, Wm. J. ..5725 Chester Ave.
Woodland 9345
Mervine Bros. .....616 N. 5th St.
Market 2791 Main 7577
Miller, Martin .....1330 S. 54th St.
Woodland 3813
Modern Plumbing & Heating Co., Inc.
3621 Market St.
Evergreen 1964 West 1927
Mondschein, Wm. ....4713 N. Broad St.
Michigan 5948
Moore, Walter P. ....216 Chancellor St.
Lombard 3709 Main 3489

CONTRACTORS—PLUMBING CONTRACTORS—Continued

Mulhern Bros. .....318 S. 52d St.
Allegheny 2478 West 2046
Nitterour, J. G. ....107 E. Chelten Ave.
Germantown 0995
Owens & Phillips ....1036 S. Frazier St.
Sherwood 5727
Park Bros. & Walls ..5844 Montrose St.
Allegheny 2726
Passer, Victor M. .....615 S. 18th St.
Oregon 5913
Peale, Clifton .....1735 Sansom St.
Rittenhouse 3787
Peters, W. Adolph ..2838 W. Lehigh Ave.
Diamond 0614
Powell, L. J. .....1543 S. 58th St.
Woodland 0211
Praid, Walter .....4134 N. Franklin St.
Michigan 3800
Rees, Christian .....251 W. Sedgley St.
Garfield 0634
Royal Home Heating Co. ..52 N. 60th St.
Granite 3163 West 2260
Savage, Wm. T. .....2104 N. 6th St.
Columbia 1214 Park 4966
Schmidt & Safran .....433 Market St.
Lombard 8974
Shea, James A. .....1748 N. 61st St.
Belmont 7518
Shreve, Isaac S. .....6913 Tulip St.
Tacony 1275
Smith, Robert J. .....5717 Chester Ave.
Woodland 2241
Sohle, James .....3145 N. 15th St.
Tioga 4664
Stelker, Edward A. .....455 N. 6th St.
Granite 2246
Stilwell, Harry L. ..13th & Windrim Sts.
Michigan 1941
Taylor, John J. .....5502 Chancellor St.
Allegheny 1190
Thompson Bros. ....520 Buttonwood St.
Market 0254 Main 2754
Ty, Frank D. & Son .....55 N. 10th St.
Walnut 0463
Uber, N. W. C. ..4634 Woodland Ave.
Woodland 0341
Uliante, Tony .....1931 S. 13th St.
Oregon 5013
Vackenhut, Fred. G. ....2416 Fkd. Ave.
Regent 8214
Walters, Wm. H. & Sons
1314 N. Carlisle St.
Stevenson 8539 Park 3016
Ward, W. A. .....6568 Haverford Ave.
Allegheny 4926

CONTRACTORS—STEEL ERECTION CONTRACTORS

Baumann, A. C. ....7011-21 Grays Ave.
Woodland 0685
Belmont Iron Works
22d St. & Washington Ave.
Oregon 0510
Bethlehem Fabricators, Inc.
312 S. Broad St.
Pennypacker 7560 Race 7019
Cantley & Co. .....Harrison Bldg.
Rittenhouse 8962 Race 6640
(See advertisement page 69)
McClintic-Marshall Co. ....Morris Bldg.
Rittenhouse 0850
Riter-Conley Co. .....Morris Bldg.
Rittenhouse 0850

CONTRACTORS' COMPRESSED AIR SERVICE

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

CONTRACTORS' EQUIPMENT

Beckwith Machinery Co.
Front & Brown Sts.
Market 2735 Park 4084
Chaulk, John J. & Co.
508 S. Delaware Ave.
Lombard 2173 Main 4662
Coates & Rainer, Inc. ....244 N. 22d St.
Rittenhouse 6930 Race 7444
Cusack Hardware Co. .....1004 Arch St.
Walnut 1004 Race 5781
Equipment Corp. of Amer. ..Horn Bldg.
Rittenhouse 5498 Race 7064
Giles & Ransome .....231 N. 12th St.
Walnut 5666
Hanson, E. M. & Co. ....130 N. 4th St.
Market 5280 Main 7381
Levis, Henry & Co.
Commercial Trust Bldg.
Rittenhouse 2618
Service Supply Corp.
20th & Venango Sts.
Tioga 6290 Park 5551
Seyferts, L. F., Sons, Inc. ..437 N. 3d St.
Market 0758 Main 4330
Shannon, J. J. & Co. ..1744 Market St.
Rittenhouse 1744 Race 1744
Staley & Morris, Inc. ....214 N. 22d St.
Rittenhouse 5160 Race 1988
Standard Supply & Equipment Co.
17th St. & Lehigh Ave.
Columbia 6410 Park 2014

CONTRACTORS EQUIPMENT—Continued

Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789
Wilson, E. H. & Co. Commercial Tr. Bldg.
Rittenhouse 0161
DeHuff & Hopkins .....Morris Bldg.
Rittenhouse 0453 Race 9659

CONVERSATION HOLES—ORNAMENTAL BRONZE

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

CONVEYORS—ASH CONVEYORS

Bartlett & Snow .....Schaff Bldg.
Rittenhouse 3590
Elliot, Edwin & Co. .....560 N. 16th St.
Poplar 0747
Girtanner Engineering Co. ..Morris Bldg.
Rittenhouse 9730
Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7825
Specialty Engineering Co.
Allegheny & Trenton Aves.
Regent 2785 East 8905
Victor Engineering Co., Inc. Bullitt Bldg.
Lombard 0311

CONVEYORS—BELT CONVEYORS

Alvey-Ferguson Co.
Real Estate Trust Bldg.
Pennypacker 4672
Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459
Latimer, Robt. L. & Co. ..24 N. Front St.
Market 0335 Main 5621
Robins Conveying Belt Co.
Widener Bldg.
Rittenhouse 1194
Specialty Engineering Co.
Allegheny & Trenton Aves.
Regent 2785 East 8905

CONVEYORS—COAL CONVEYORS

Bartlett & Snow .....Schaff Bldg.
Rittenhouse 3590
Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7825

CONVEYORS—CINDER CONVEYORS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925

CONVEYORS—GRAVITY CONVEYORS

Alvey-Ferguson Co. ...Rl. Est. Tr. Bldg.
Pennypacker 4672
Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459
Standard Conveyor Co. ..3110 Market St.
Evergreen 2801

CONVEYORS—MERCHANDISE CONVEYORS

Haslett Chute & Conveyor Co.
Harrison Bldg.
Spruce 3459
Lamson Co. .....1315 Race St.
Rittenhouse 6380 Race 4883
Mathews Conveyor Co. ....1505 Race St.
Locust 7293
Specialty Engineering Co.
Allegheny & Trenton Aves.
Regent 2785 East 8905

CONVEYORS—PACKAGE CONVEYORS

Alvey-Ferguson Co. ...Rl. Est. Tr. Bldg.
Pennypacker 4672

CONVEYORS—PORTABLE CONVEYORS

DeHuff & Hopkins .....Morris Bldg.
Rittenhouse 0453 Race 9659
Haiss, George, Mfg. Co. ....Schaff Bldg.
Rittenhouse 6250
Latimer, Robt. L., & Co. .24 N. Front St.
Market 0335 Main 5621
Link Belt Co.
Hunting Park Ave. & Nicetown Sta.
Wyoming 8800 Park 5381
Specialty Engineering Co.
Allegheny & Trenton Aves.
Regent 2785 East 8905

COOLING SYSTEMS

Carrier Engineering Corp.
Land Title Bldg.
Rittenhouse 5586 Race 7836

COOLING TOWERS

oling Tower Co. .....2222 Arch St.
Rittenhouse 5950 Race 5789

OPELAND ELECTRIC REFRIGERATION

ila.-Copeland Refrigeration Co.
126 S. 16th St.
Rittenhouse 8875

COPPER TUBES

(See Tubes—Copper Tubes)

COPPER WORK

me Coppersmithing & Machine Co.
1024 Ridge Ave.
Walnut 4786 Race 1495
yer, Paul .....312 Fairmount Ave.
Market 0543 Main 6848
ntinental Coppersmithing Co.
210 Dickinson St.
Oregon 7321 Main 6170
rd Bros. & Co. .....1612 S. Front St.
Oregon 1487 Main 8359
eller, A. .....327 N. 2d St.
Market 4641
pperman, Jos., & Sons ....316 New St.
Market 0286
berty Coppersmithing Co.
1708 N. Howard St.
Regent 2439 Park 1130

CORK COMPOSITION TILE

nnedy, David E., Inc.
1133 Real Estate Trust Bldg.
Pennypacker 2851 Race 2658

CORK FLOORING

(See Flooring—Cork Flooring)

CORK INSULATION

(See Insulation—Cork Insulation)

CORK PRODUCTS

ndet, L., & Son .....329 N. 2d St.
Market 3418
(See advertisement page 128)

CORK TILE FLOORING

nnedy, David E., Inc.
1133 Real Estate Trust Bldg.
Pennypacker 2851 Race 2658

CORNICES—METAL CORNICES

Consolidated Cornice & Roofing Works
2519 Moore St.
Oregon 0730
Gara, McGinley, Co. .....218 N. 13th St.
Spruce 3896 Race 7054
Belmont Cornice & Roofing Co.
4062 Aspen St.
Baring 1080
International Cornice & Roofing Co., Inc.
2918 Wharton St.
Oregon 2717
Kaercher, Albert F. ....2906 Fletcher St.
Columbia 5585
Kastrup, A. & J. C. .....93 Moore St.
Oregon 6830 Main 5048
Randall, Howard ....815 Allegheny Ave.
Garfield 3373
Wackerman, Albert, & Son
5356 Chew St.
Germantown 1647

CORNER BEADS—METAL CORNER BEADS

Architectural Steel Engineering Co.
1514 N. 13th St.
Stevenson 7058 Park 4124
Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115
Penn Metal Co., Ltd.
25th & Wharton Sts.
Oregon 4600 Race 6916

COUNTERS—STEEL COUNTERS

Lupton's Sons Co., David
Allegheny Ave. & Tulip St.
Regent 9700 East 7951

COUPLINGS—SLIP COUPLINGS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

COVERS—CESS POOL COVERS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

COVERS—COAL HOLE COVERS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

COVERS—DUCT COVERS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

COVERS—GARAGE SUMP AND CLEANOUT

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

COVERS—MANHOLE COVERS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

COVERS—MANHOLE AND METER PIT COVERS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(See advertisement page 70)

COVERS—SUMP COVERS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

CRAFTEX WALL FINISH

Crafts Decorating Co.
521 Land Title Bldg.
Rittenhouse 4440 Race 3431
(See advertisement page 146)

CRANES—ELECTRIC TRAVELING CRANES

Box Crane & Hoist Corp.
Ontario St. & Trenton Ave.
Jefferson 3571
Harnischfeger Sales Corp.
5102 Lancaster Ave.
Belmont 9795 West 3950
Niles Crane Corp.
Mifflin St. E. Front St.
Oregon 1523 Main 6778
Shepard Elec. Crane & Hoist Co.
City Centre Bldg.
Locust 7913 Race 9588
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

CRANES—HAND TRAVELING CRANES

Box Crane & Hoist Corp.
Ontario St. N. Trenton Ave.
Jefferson 3571

CRANES—STEAM TRAVELING CRANES

Box Crane & Hoist Corp.
Ontario St. N. Trenton Ave.
Jefferson 3571
Niles Crane Corp. Mifflin St. E. Front St.
Oregon 1523 Main 6778
Shaw Electric Crane Co. ....Fox Bldg.
Rittenhouse 7216

CREOSOTE BLOCKS—SEE PAVING—WOOD BLOCK PAVING CREOSOTE PRODUCTS

Jennison-Wright Co. .....Crozer Bldg.
Rittenhouse 8469
Republic Creosoting Co.
City Centre Bldg.
Locust 0513

CURB BAR

Baker Warehouse ....C & Venango Sts.
Regent 8474 East 7281
Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115

WAINWRIGHT CURB BAR

Steel Protected Concrete Co.
1622 Real Estate Trust Bldg.
Pennypacker 3683

CURB SETTING

Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728
(See advertisement page 244)
Graham, Frank C. .....5707 N. 7th St.
Waverly 4034
Reuter, P. N. .....1043 W. Venango St.
Tioga 8693-W

CURTIS WOODWORK

Gillingham Co. ..Norris & Richmond Sts.
Regent 8450 East 7975

CUT STONE

(See Stone—Cut Stone)

AMPERS—AUTOMATIC DAMPERS

teel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

AMPERS—FIREPLACE DAMPERS

teel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

DAMPER REGULATORS

(See Regulators—Damper Regulators)

DAMPPROOFING

Hydroseal Waterproofing Co.
829-35 N. 3d St.
Market 4525
(See advertisement page 101)
Larson Waterproofing Co.
1700 Walnut St.
Pennypacker 9265 Race 5148
(See advertisement page 146)
Labot, S., Inc. ..Real Estate Tr. Bldg.
Pennypacker 3517 Race 5501
R. I. W. Dampresisting Paint Co.
Bourse Bldg.
Lombard 1031

DECORATORS—INTERIOR DECORATORS PAINTING AND PAPERHANGING

Allen, A. M., Co. 1626
W. Wingohocking St.
Wyoming 6748
Allegheny Decorating Co.
201 E. Wishart St.
Garfield 3987
Aucker Decorating Co. ..1308 Wallace St.
Poplar 2331
Amlung & Doherty ..5209 Larchwood St.
Allegheny 2617
Boyd, John C. .....5502 White Ave.
Allegheny 1119
Gibson, Edw. R. .....1231 S. 56th St.
Allegheny 3610
King, Carl C. .....6621 Musgrave St.
Germantown 6623
Mannices, Wm. .....3510 N. Front St.
Garfield 2162
Primavera, A. .....1205 Federal St.
Jackson 4322
Rau, Henry S., Co. ....1937 Market St.
Rittenhouse 6296 Race 6757
Shaffer, C. .....5042 N. 5th St.
Michigan 7440
Sage, W. F. .....7008 Saybrook Ave.
Woodland 8747

DEHUMIDIFYING APPARATUS

Carrier Eng. Corp ....Land Title Bldg.
Rittenhouse 5586 Race 7836

DEMOLITIONS—COMPRESSED AIR DEMOLITIONS

Compressed Air Service Corp.
1015 Chestnut St.
Walnut 6488 Race 3401
(See advertisement page 78)

DERRICKS

Beckwith Machinery Co.
Front & Brown Sts.
Market 2735 Park 4084
Dravo Equipment Co., Inc. ..Schaff Bldg.
Rittenhouse 6250 Race 1956
Equipment Corp. America ..Horn Bldg.
Rittenhouse 5498 Race 7064
Shannon, J. Jacob & Co. 1744 Market St.
Rittenhouse 1744 Race 1744

DOOR ELECTRIC OPERATORS—FREIGHT

Quincy Elevator Gate Co. ....Tiffin, O.

DOORS—ASH PIT DOORS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7925
Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

DOORS—BRONZE DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Reliance Fireproof Door Company
1600 Walnut St.
Pennypacker 1488 Race 1968
(See advertisement page 118)

DOORS—CELLAR DOORS—IRON CELLAR DOORS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

DOORS—CELLAR DOORS—IRON CELLAR DOORS—Continued

Ward, Jos., T., Co. ....5809 Baynton St.
Germantown 3555
(See advertisement page 146)
Architectural Steel Engineering Co., Ltd.
1518 N. 13th St.
Stevenson 7058 Park 4124
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Berko Bros. Co. ..Randolph & Wood Sts.
Market 0317 Main 9018

DOORS—CLEAN OUT DOORS

Steel & Wike Co......533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

DOORS—DRAWN METAL DOORS

Ohnstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)

DOORS—ELEVATOR DOORS—FREIGHT

Dahlstrom Metallic Door Co.
Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)
Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)
Elevator Safety Appliance Co.
34 S. 16th St.
Rittenhouse 8243
Peellee Co. .....34 S. 16th St.
Rittenhouse 8243

DOORS—ELEVATOR DOORS—PASSENGER ELEVATORS

Dahlstrom Metallic Door Co.
Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)
Phila. Fire Retardant Co., Inc.
1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Elevator Safety Appliance Co.
34 S. 16th St.
Rittenhouse 8243

DOORS—FIRE DOORS—AUTOMATIC FIRE DOORS

Hammond, R. R., & Co. ..Widener Bldg.
Rittenhouse 0963
Kinnear Mfg. Co. .....17th & Arch Sts.
Rittenhouse 9288 Race 7134

DOOR CHECKS

Wartenby, Harry A.
1723 Brandywine St.
Poplar 8660

DOOR CLOSERS

Hendrickson, T. B., & Co.
525 Commerce St.
Lombard 8246 Main 4271

DOORS—FIRE DOORS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Gassner, Thos. S., Co. ..4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Phila. Fire Retardant Co., Inc.
1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Ajax Contg. Co. .....322 S. 7th St.
Lombard 1713
Elevator Safety Appliance Co.
34 S. 16th St.
Rittenhouse 8243
English & Co., Inc. .259 N. Lawrence St.
Market 0313
Johnson, T. S., Sons Co.
622-4-6 Cherry St.
Market 5538 Main 1154
Merchant & Evans Co. ..2035 Wash. Ave.
Oregon 7900 Race 4821
Penn Metal Co. ....25th & Wharton Sts.
Jackson 6300 Race 6916
Reliance Fireproof Door Co.
1600 Walnut St.
Pennypacker 1488 Race 1968
Bur-Vet Mfg. Co. ....929 Chestnut St.
Walnut 2148

DOORS—FURNITURE STEEL COVERED DOORS

Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)

DOORS—GARAGE DOORS

Lawndale Lumber Co., Inc. ...Otis Bldg.
Rittenhouse 2783
Overhead Door Sales of Phila.
1526 Vine St.
Rittenhouse 2295

DOORS—HOLLOW METAL DOORS

Kassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Clancy, James A. .....Harrison Bldg.
Spruce 7791 Race 2911
Dahlstrom Metallic Door Co.
Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)
Phila. Fire Retardant Co., Inc.
1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)
United Metal Products Co.
1600 Walnut St.
Pennypacker 1488
Variety Fire Door Co. .....1321 Arch St.
Rittenhouse 7538

DOORS—IRON DOORS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

DOORS—KALAMEIN DOORS

Kassner, Thos. S., Co. ..4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)
Jax Contracting Co. ....322 S. 7th St.
Lombard 1713
Clancy, James A. .....Harrison Bldg.
Spruce 7791 Race 2911
Jewell, A. J., Co. .....1505 Arch St.
Locust 0619 Race 2604
Mackay, Robt. R. ....Pennsylvania Bldg.
Rittenhouse 0642 Race 4662
Thorn, J. S., Co.
20th St. & Allegheny Ave.
Tioga 8532 Park 4694

DOORS—MANHOLE DOORS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

DOORS—MAUSOLEUM DOORS—ORNAMENTAL BRONZE

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

DOORS—METAL COVERED DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

DOORS—POWER OPERATED DOORS

Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)

DOORS—ORNAMENTAL IRON DOORS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

DOORS—REVOLVING DOORS

Wilson, F. J., Co. .....1600 Walnut St.
Pennypacker 1488-1489 Race 1968
(See advertisement page 118)
Atchison Revolving Door Co.
Pennsylvania Bldg.
Rittenhouse 0642
Van Kanel Revolving Door Co.
1600 Walnut St.
Pennypacker 1488 Race 1968

DOORS—ROLLING STEEL DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Wilson, J. G., Corp. ....1700 Walnut St.
Pennypacker 4360
Cornell Rolling Steel Door Co.
Fuller Bldg.
Rittenhouse 8832 Race 5714
Kinnear Mfg. Co. .....17th & Arch Sts.
Rittenhouse 9288 Race 7134

DOORS—SCREEN DOORS

Higgin Mfg. Co. .....Lincoln Bldg.
Rittenhouse 2795

DOORS—SIDEWALK DOORS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

DOORS—SLIDING CORRUGATED STEEL DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

DOORS—STEEL DOORS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Reliance Fireproof Door Co.
1600 Walnut St.
Pennypacker 1488 Race 1968
(See advertisement page 118)

DOORS—STORAGE WAREHOUSE DOORS

Reliance Fireproof Door Co.
1600 Walnut St.
Pennypacker 1488 Race 1968

DOORS—SWINGING CORRUGATED STEEL DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036

DOORS—TIN CLAD DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Clancy, James A. .....Harrison Bldg.
Spruce 7791 Race 2911

DOORS—VAULT DOORS

Remington & Sherman Co.
1545 N. Delaware Ave.
Regent 7626

DOORS—VAULT LIGHT DOORS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

DOORS—WAREHOUSE DOORS—FOLDING WAREHOUSE DOORS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

DOOR BEDS

Murphy In-A-Door Bed
Murphy Door Bed Co...512 Bulletin Bldg.
Spruce 6680 Race 5043

DOOR CHECKS

Murphy & Read .....317 Cherry St.
Market 2777
Nissen, John .....1908 Atlantic St.
Tioga 5536
Osterman, Joseph .....115 N. 10th St.
Walnut 1264 Race 3861
Taylor & Beiler .....12 S. 20th St.
Rittenhouse 5869

DOOR CLOSERS

Norton Door Closer Co.
525 Commerce St.
Lombard 8246

DOOR FRAMES—DRAWN METAL DOOR FRAMES

Ohnstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)

DOOR HANGERS

Richards-Wilcox Mfg. Co. ..507 Arch St.
Lombard 8824 Main 4859

DOOR HOLDING DEVICES

Newell, A. J., Co. .....1505 Arch St.
Locust 0619 Race 2604

DOOR JAMBS—DRAWN STEEL DOOR JAMBS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

DOOR OPERATORS—AUTOMATIC ELECTRIC DOOR OPERATORS

"Cyco" Sales Corp. of America
3954 Ludlow St.
Evergreen 2723

DOOR OPERATORS—FREIGHT ELEVATOR ELECTRIC DOOR OPERATORS

Quincy Elevator Gate Co. ..Tiffin, Ohio

DOOR OPERATORS—GARAGE ENTRANCE DOOR OPERATORS

Quincy Elevator Gate Co. ..Tiffin, Ohio

DRAFTSMEN

Canavan, F. P. .....6032 Greenway Ave.
Woodland 2364-J
Durham Bros. .....34 S. 17th St.
Rittenhouse 5706
Lehigh Draftshop .....2645 N. 6th St.
Regent 3193

DRAFTSMEN'S SUPPLIES

Warren-Knight Co. .....136 N. 12th St.
Locust 3984 Race 5567

DRAIN PIPE—ACID RESISTANT DRAIN PIPE

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

DRAINS—CELLAR DRAINS

Brogan & Co. .....810 Race St.
Walnut 6791 Main 9147

DRAINS—FACTORY AND GARAGE DRAINS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave.
Detroit, Michigan
(See advertisement page 70)

DRAINS—SEEPAGE FLOOR DRAINS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave.
Detroit, Michigan
(See advertisement page 70)

DRAINS—GUTTER & AREAWAY DRAINS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave.
Detroit, Michigan
(See advertisement page 70)

DRAWING INSTRUMENTS

Keystone Blue Paper Co.
910 Filbert St.
Walnut 4614 Race 7119
Warren-Knight Co. .....136 N. 12th St.
Locust 3984 Race 5567
Williams, Brown & Earle, Inc.
918 Chestnut St.
Pennypacker 7320 Main 7261

DRAWING MATERIALS

Altneder, Theo. & Sons
1217 Spring Garden St.
Poplar 3180
Art Importing Co., 6th & Chestnut Sts.
Lombard 7377
Atlas Blue Print Co. ....34 S. 16th St.
Rittenhouse 8894 Race 7632
Defiance Sales Corp. .....1214 Arch St.
Spruce 8842
Dietzgen Eugene Co. ..1521 Sansom St.
Rittenhouse 9020 Race 5529
Keystone Blue Paper Co., 910 Filbert St.
Walnut 4614 Race 7119
Robbins, Chas. H. Co. ..1729 Sansom St.
Rittenhouse 7530 Race 3519
Weber, F. Co. .....125 S. 12th St.
Poplar 6900 Race 7477
Quaker City Blue Print Co.
1617 Sansom St.
Rittenhouse 8140 Race 7584
Taws, Henry M. .....920 Arch St.
Walnut 6423

DRILLS—ROCK DRILLS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement, page 36)

DRILLING—ROCK DRILLING—COMPRESSED AIR

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement, page 78)

DRILLING—TEST DRILLING

Artesian Well Drilling Co.
Aramingo & Girard Aves.
Regent 1318 East 7042
Ridpath & Potter Co. 22d & Cambria Sts.
Columbia 6397 Park 3414

DRILLING—WELL DRILLING
(See Well Drilling—Artesian)

DRYERS—INDUSTRIAL DRYERS

Carrier Engineering Corp.
Land Title Bldg.
Rittenhouse 5586 Race 7836

DUMBWAITERS—HAND DUMBWAITERS

Elevator Engineering & Construction Co.
250 N. Marvine St.
Walnut 1739 Race 1015
(See advertisement page 108)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
(See advertisement page 108)
Massa, George .....245 S. 6th St.
Lombard 3561

DUMBWAITERS—HAND DUMBWAITERS

Energy Elevator Co. ...210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
Paris, C. W., Co. .....1019 Callowhill St.
Walnut 2949

DUMBWAITERS—ELECTRIC DUMBWAITERS

Elevator Engineering & Construction Co.
250 N. Marvine St.
Walnut 1739 Race 1015
(See advertisement page 108)
Warsaw Elevator Co. .124 N. Carlisle St.
Rittenhouse 8296 Race 3472
Energy Elevator Co. ...210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
(See advertisement page 108)
Paris, C. W., Co. .....1019 Callowhill St.
Walnut 2949

DUST COLLECTING SYSTEMS

Drieling, G., & Co. ..1716 N. Amer. Bldg.
Columbia 2107
Skinner Bros. Mfg. Co., Inc.
Pennsylvania Bldg.
Rittenhouse 7377

ELECTRIC DEVICES—FANS—ELECTRIC FANS

Robbins & Meyers Co. ..1418 Walnut St.
Pennypacker 6917 Race 5246
Rumsey Electric Co. .....1007 Arch St.
Walnut 6260 Race 7401
Safety Car Heating & Lighting Co.
1738 Commercial Trust Bldg.
Rittenhouse 2255
Stewart, Frank H., Electric Co.
37 N. 7th St.
Lombard 7740 Main 8301

ELECTRIC DEVICES—HEATERS—ELECTRIC

Brazer, Geo. M., Inc. ....925 Cherry St.
Walnut 4143
Majestic Electric Appliance Co.
1705 Allegheny Ave.
Tioga 7405
Trent, Harold E., Co. ....439 N. 12th St.
Poplar 4484 Race 3844

ELECTRIC DEVICES—IRONS—ELECTRIC

Spahr Electrical Appliance Co.
1425 Vine St.
Rittenhouse 7046

ELECTRIC DEVICES—REFRIGERATORS—ELECTRIC
(See Refrigerators—Electric)

ELECTRIC DEVICES—STATIONARY VACUUM CLEANERS
(See Vacuum Cleaners—Stationary)

ELECTRIC SIGNS
(See Signs—Electric Signs)

ELECTRICAL CONTRACTORS
(See Contractors—Electrical)

ELECTRICAL ENGINEERS
(See Engineers—Electrical)

ELECTRIC EQUIPMENT—CONTROLLERS—ELECTRIC

Allen-Bradley Co. .....Bulletin Bldg.
Spruce 2256
Fewkes, Jos. T., & Co. ..137 N. 12th St.
Walnut 3745 Race 5653

ELECTRIC EQUIPMENT—SWITCHBOARDS AND PANELBOARDS

dam, Frank, Elec. Co. ..244 N. 10th St.
Walnut 4297 Race 1535
ndustrial Mfg. & Electric Co.
416 N. Orianna St.
Market 2738 Main 8059
arge-Dail Mfg. Co. .....606 Cherry St.
Market 2547 Main 1928
Iendel Electric Mfg. Co.
Real Estate Trust Bldg.
Pennypacker 3197
ringle Electrical Mfg. Co.
1906 N. 6th St.
Diamond 7600 Park 3949
Valker Switchboard Co.
1020 W. Susquehanna Ave.
Columbia 0475 Park 2753

ELECTRIC FIXTURES

(See Fixtures—Electric)

ELECTRIC IRONS

(See Electric Devices—Irons—Electric)
urke Electric Co. .....1600 Arch St.
Rittenhouse 5226 Race 3479
(See advertisement page 169)
)elta Equipment Co. .....148 N. 3d St.
Market 1860 Main 9188

ELECTRIC MACHINERY—MOTORS —ELECTRIC

urke Electric Co. .....1600 Arch St.
Rittenhouse 5226 Race 3479
(See advertisement page 169)
ond, Charles, Co. .....617 Arch St.
Market 3990 Main 7701
rocker-Wheeler Elec. Mfg. Co.
1209 Arch St.
Spruce 7867
)elta Equipment Co. .....148 N. 3d St.
Market 1860 Main 9188
ewkes, Jos. T., & Co. ...137 N. 12th St.
Walnut 3745 Race 5653
idelity Electric Co. .....The Bourse
Lombard 9300
razer, H. B., & Co. .....250 N. 11th St.
Walnut 3975
incoln Electric Co.
1921 Brandywine St.
Poplar 6675 Race 5611
Iotor Exchange .....327 N. 3d St.
Market 1914 Main 6291
orthwestern Electric Co. ..Fuller Bldg.
Rittenhouse 7442 Race 2763
orthwestern Mfg. Co. ...Bulletin Bldg.
Locust 5118 Race 2076

ELECTRIC MACHINERY—MOTORS —ELECTRIC—Continued

Rodda-Wolfe Co. .....10 S. 18th St.
Rittenhouse 7442 Race 2763
Scheinert, R., Co. .....123 N. 3d St.
Market 4416 Main 6448
Westinghouse Elec. & Mfg. Co.
Walnut St. at 30th St.
Evergreen 8700 West 3401
Winterer, Herman L. ..943 N. Front St.
Market 6121 Park 2268
Allis-Chalmers Mfg. Co. ..Atlantic Bldg.
Pennypacker 3511 Race 4369

ELECTRIC MACHINERY—PLANTS —ELECTRIC

Delco-Light Products ..810 N. Broad St.
Poplar 9613
Fewkes, Jos. T., & Co. ...137 N. 12th St.
Walnut 3745 Race 5653

ELECTRIC PLANTS

(See Electric Machinery Plants—Electric)

ELECTRICAL SUPPLIES

Northwest Electric Supply Co.
2433 N. 29th St.
Columbia 6303 Park 3789
Phila. Electrical Supply Co.
132 S. 11th St.
Pennypacker 2600
Stewart, Frank H., Electric Co.
37 N. 7th St.
Lombard 7740
Roberts, H. C., Electric Supply Co.
11th & Race Sts.
Walnut 8950 Race 7301
West Phila. Electric Supply Co.
5203 Market St.
Allegheny 9296 West 3078
Same .....5943 Market St.
Granite 3014

ELECTRIC WELDING

(See Welding—Electric)

ELEVATORS—CONVERTING ELEVATORS

Elevator Engineering & Construction Co.
250 N. Marvine St.
Walnut 1739 Race 1015
(See advertisement page 108)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
(See advertisement page 108)

ELEVATORS—CONVERTING ELEVATORS—Continued

Paris, C. W., Co. ....1019 Callowhill St.
Walnut 2949

ELEVATORS—ELECTRIC ELEVATORS

Energy Elevator Co. ....210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
(See advertisement page 108)

ELEVATORS—FREIGHT ELEVATORS

Atlantic Elevator Co. ..Liberty Tr. Bldg.
Rittenhouse 9505 Race 4091
Energy Elevator Co. ....210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
Otis Elevator Co. .....110 S. 16th St.
Rittenhouse 5500 Race 6941
(See advertisement page 108)
Paris, C. W., Co. ....1019 Callowhill St.
Walnut 2949
(See advertisement page 102)
Warsaw Elevator Co. ..124 N. Carlisle St.
Rittenhouse 8296 Race 3472
Class Elevator Co. ..2557 Frankford Ave.
Regent 2716
Corbett Elevator Co.
2023 E. Fletcher St.
Regent 5902 East 9086
Elevator Construction & Repair Co.
621 Commerce St.
Lombard 7940 Main 9038
Ever-Ready Elevator Co.
419 New Market St.
Market 2954
Haines Bros. Elevator Co. ..237 Ionic St.
Lombard 4544
Independence Elevator Co.
7th & Wood Sts.
Market 1671 Main 9194

ELEVATORS—FREIGHT ELEVATOR MANUFACTURERS

Gurney Elevator Co. .....1207 Race St.
Spruce 7315 Race 5518

ELEVATORS—HAND ELEVATORS

Energy Elevator Co. ..210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
(See advertisement page 108)

ELEVATORS—PASSENGER ELEVATORS

Otis Elevator Co. .....110 S. 16th St.
Rittenhouse 5500 Race 6941
(See advertisement page 108)
Paris, C. W., Co. ....1019 Callowhill St.
Walnut 2949
(See advertisement page 102)
Elevator Engineering & Constr. Co.
250 N. Marvine St.
Walnut 1739 Race 1015
(See advertisement page 108)
Elevator Machine & Electric Co.
724 Cherry St.
Lombard 8178 Main 3490
Atlantic Elevator Co., Inc.
Liberty Trust Bldg.
Rittenhouse 9505 Race 4091
Warsaw Elevator Co. ..124 N. Carlisle St.
Rittenhouse 8296 Race 3472
Class Elevator Co. ..2557 Frankford Ave.
Regent 2716
Corbett Elevator Co.
2023 E. Fletcher St.
Regent 5902 East 9086
Elevator Construction & Repair Co.
621 Commerce St.
Lombard 7940 Main 9038
Ever-Ready Elevator Co.
419 New Market St.
Market 2954
Haines Bros. Elevator Co. ..237 Ionic St.
Lombard 4544
Independence Elevator Co.
7th & Wood Sts.
Market 1671 Main 9194

ELEVATORS—INVALID ELEVATORS

Energy Elevator Co. ..210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)

ELEVATORS—PASSENGER ELEVATOR MANUFACTURERS

Gurney Elevator Co. .....1207 Race St.
Spruce 7315 Race 5518

ELEVATORS—PORTABLE ELEVATORS

arrett-Cravens Co. .....1830 Arch St.
Rittenhouse 6624
ewis-Shepard Co. .....709 Arch St.
Lombard 1983
evolvator Co. .....2401 Chestnut St.
Rittenhouse 9840

ELEVATORS—SIDEWALK ELEVATORS

nergy Elevator Co. ..210-218 New St.
Market 0822 Main 9004
(See advertisement page 102)
aris, C. W., Co. ....1019 Callowhill St.
Walnut 2949
(See advertisement page 102)

ELEVATOR DOORS—FREIGHT AND PASSENGER

(See Doors—Elevator Doors)

ELEVATOR ENCLOSURES

etches, George .....Atlantic Bldg.
Pennypacker 9127
yler, Co. .....Atlantic Bldg.
Pennypacker 9127

LEVATOR ENTRANCES—DRAWN METAL

hnstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)

ELEVATOR GATES

levator Engineering & Constr. Co.
250 N. Marvine St.
Market 1739 Race 1015

ELEVATOR INTERLOCKS

tis Elevator Co. .....112 S. 16th St.
Rittenhouse 5500 Race 6941
(See advertisement page 108)
enkins Interlock Mfg. Co.
13th & Hamilton Sts.
Poplar 8336
Varsaw Elevator Co. ..124 N. Carlisle St.
Rittenhouse 8296 Race 3472

ELEVATOR REPAIRS

Elevator Engineering & Constr. Co.
250 N. Marvine St.
Walnut 1739 Race 1015
(See advertisement page 108)
Paris, C. W., Co. ....1019 Callowhill St.
Walnut 2949
(See advertisement page 102)
Active Elevator Co. ..212 Chancellor St.
Lombard 5398 Main 1335
Albro, Clem Elevator Co.
D St. & Erie Ave.
Regent 2174 Race 4091
Atlantic Elevator Co., Inc.
D St. & Erie Ave.
Regent 2174 Park 5331
Elevator Construction & Repair Co., Inc.
621-23 Commerce St.
Lombard 1940 Main 9038
Haines Bros. Elevator Co. ..237 Ionic St.
Lombard 4544
Haughton Elevator & Mach. Co.
1217 Race St.
Locust 3835
Imperial Elevator Co. ....923 Locust St.
Walnut 1707 Main 8584
Independence Elevator Co.
7th & Wood Sts.
Market 1671 Main 9194

ELEVATOR SAFETY DEVICES

(See Safety Appliances—Elevator Safety Appliances)

ELEVATOR SIGNALS

Otis Elevator Co. .....112 S. 16th St.
Rittenhouse 5500 Race 6941
(See advertisement page 108)
Viking Products Corp. ....Packard Bldg.
Spruce 3737

ENCLOSURES—ELEVATOR

(See Elevator Enclosures)

ENCLOSURES—PORCH

(See Porch Enclosures)

ENAMEL

Nice Co., Eugene E. .....238 S. 2d St.
Lombard 1877 Main 5852

ENGINE REPAIRS—HOISTING ENGINE REPAIRS

Kruger & Blind Co. .....511 Master St.
Diamond 4320

ENGINEERS—ACOUSTICAL ENGINEERS

Celotex Co. .....Elverson Bldg.
Rittenhouse 2698
Mazer, Jacob .....1715 Chestnut St.
Rittenhouse 6696
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150

ENGINEERS—AUTOMOTIVE ENGINEERS

Progressive Engineering & Tool Co.
5601 Germantown Ave.
Germantown 5685
Williams Bros. Co. .....3078 Helen St.
Regent 2445

ENGINEERS—BANK VAULT ENGINEERS

Chryst, Wm. Geo. ..1145 S. Wilton Ave.
Woodland 2306
Yeo, Sam P. .....1824 Ludlow St.
Rittenhouse 7480

ENGINEERS—CENTRIFUGAL ENGINEERS

Sharples Specialty Co.
23d & Westmoreland Sts.
Tioga 9484

ENGINEERS—CHEMICAL ENGINEERS

Porter, Horace C. ....1833 Chestnut St.
Locust 2139

ENGINEERS—CIVIL ENGINEERS

Birkinbine Engineering Offices
Commercial Trust Bldg.
Rittenhouse 0785
Carson & Carson .....22 S. 15th St.
Locust 5170 Race 1874
Finston, D. C. .....26 S. 15th St.
Rittenhouse 0978
Franklin & Co. .....1420 Chestnut St.
Rittenhouse 1766
Harrison, Mertz & Emlen, Inc.
5328 Greene St.
Germantown 9904
Sigmund, B. J. .....1505 Race St.
Rittenhouse 6470

ENGINEERS—COMBUSTION ENGINEERS

Coleman, W. B. & Co. 15th & Wallace Sts.
Poplar 4648
Frederick, Traugott & Allen, Inc.
1518 Vine St.
Rittenhouse 0916

ENGINEERS—CONSTRUCTING ENGINEERS

Armstrong & Latta Co. ..1926 Sansom St.
Rittenhouse 1866
Colen, P. M., Co. .....2603 Poplar St.
Poplar 0536
Colen, P. M. .....2603-2617 Poplar St.
Poplar 0536 Race 5626
(See advertisement page 22)
Curtis Co. .....10 S. 18th St.
Rittenhouse 2885
Ingle, Chas. H. .....3025 Poplar St.
Poplar 7381
Jellett, Stewart A. Co. ..1200 Locust St.
Pennypacker 8992
Neely, M. Y., Inc.
Bustleton Pike & S. Bensalem Pike
Bustleton 0678

ENGINEERS—CONSULTING ENGINEERS

Applied Management ...Equitable Bldg.
Pennypacker 3109
Ballinger Co., The ..12th & Chestnut Sts.
Pennypacker 5800
Birkinbine Engineering Offices
Commercial Trust Bldg.
Rittenhouse 0785
Bowers Bros. & Co. ....2015 Sansom St.
Rittenhouse 9322
Colen, P. M., Co. .....2603 Poplar St.
Poplar 0536
Dyer, W. E. S. .....Land Title Bldg.
Rittenhouse 5354
Engineering Developments, Inc.
Atlantic Bldg.
Pennypacker 7943
Ford, Bacon & Davis, Inc. ..Morris Bldg.
Rittenhouse 3166
Francis, Isaac Hathaway 1520 Locust St.
Pennypacker 1980
Hackett, H. Berkeley 6th & Chestnut Sts.
Lombard 4000
Harrison, Mertz & Emlen, Inc.
5328 Greene St.
Germantown 9904
Haynes, C. V. .....2013 Sansom St.
Rittenhouse 8262

ENGINEERS—CONSULTING ENGINEERS—Continued

ires, Castner & Harris, Inc. Land Title Bldg. Rittenhouse 4521

ellett, Stewart A., Co. ..1200 Locust St. Pennypacker 8992

elly, Wm. F. ..Ins. Co. N. Amer. Bldg. Rittenhouse 2644

lauder, Louis T. ..Bankers Trust Bldg. Pennypacker 6475

eopold, Charles S. ....213 S. Broad St. Pennypacker 6430 Race 6535

lartindale, Frank L. ..2216 Chestnut St. Rittenhouse 1819

lerrill, Josiah L. .....Penna. Bldg. Rittenhouse 5731

liller, H. N. & Co. .....34 S. 17th St. Rittenhouse 5658

owers, Eugene S. & Son, Inc. 1520 Locust St. Pennypacker 0571

ublic Engineering & Construction Co. 2700 Germantown Ave. Columbia 6675

chroeder, Seaton, Jr. ....Drexel Bldg. Lombard 1090

cofield Engineering Co. Commercial Trust Bldg. Rittenhouse 0668

herman Corp. Pa. ....1015 Chestnut St. Walnut 1267

imsohn, Julian S. ..Broad & Girard Ave. Poplar 7410

ownsend, J. W., Jr. .....Drexel Bldg. Lombard 1090

Vebster, Howard J. .....Harrison Bldg. Rittenhouse 1731

Vetherill-Morris Engineering Co. Morris Bldg. Rittenhouse 0934

Vood, Albert C. ..Stock Exchange Bldg. Rittenhouse 9490

ENGINEERS—CONTRACTING ENGINEERS

rmstrong & Latta Co. ..1926 Sansom St. Rittenhouse 1866

rann & Stuart Co. Commercial Tr Bldg. Rittenhouse 3201

renneman, J. E., Co. ....N. Amer. Bldg. Pennypacker 5636

ronin, Wm. J., Jr. .....1628 Market St. Rittenhouse 8791

aufman Construction Co. ..26 S. 15th St. Rittenhouse 0978

achold & Riddell ..Stephen Girard Bldg. Rittenhouse 2154

ENGINEERS—ELECTRICAL ENGINEERS

Bozzuto, D. A. .....1725 S. 12th St. Oregon 8897

Dyer, W. E. S. .....Land Title Bldg. Rittenhouse 5354

Fewkes, Jos. T. & Co. ....137 N. 12th St. Walnut 3745

Francis, Isaac Hathaway 1520 Locust St. Pennypacker 1980

Frazer, H. B. .....250 N. 11th St. Walnut 3975

Frazer, H. B. & Co. .....250 N. 11th St. Walnut 3975

Hertzler & Zook Co. ....552 N. 16th St. Poplar 4777

Independent Wiring Co., Inc. 1613 Sansom St. Rittenhouse 4839

Jellett, Stewart A., Co. ..1200 Locust St. Pennypacker 8992

Large-Dail Mfg. Co. .....606 Cherry St. Market 2547

Leopold, Chas. S. .....213 S. Broad St. Pennypacker 6430 Race 6535

Phila. Armature Works ....632 Race St. Market 4600

Rice, C. S. Electric Co. ..537 N. 8th St. Market 2004

Walker, E. G. .....5025 Walton Ave. Sherwood 8401

ENGINEERS—FIRE PROTECTION ENGINEERS

Eggly, Harry J., Jr. ..2021 Chancellor St. Spruce 0938

ENGINEERS—FOUNDRY ENGINEERS

Wetherill-Morris Engineering Co. Morris Bldg. Rittenhouse 0934

ENGINEERS—HEATING ENGINEERS

Bowers Bros. & Co. ..2015 Sansom St. Rittenhouse 9322

Dyer, W. E. S. .....Land Title Bldg. Rittenhouse 5354

Eckardt, C. A. T. ..Commercial Tr. Bldg. Rittenhouse 0863

Eggly, Harry J., Jr. ..2021 Chancellor St. Spruce 0938

Fahy, Wm. C. & Co. ....4600 Naples St. Jefferson 8267

ENGINEERS—HEATING ENGINEERS—Continued

Francis, Isaac Hathaway 1520 Locust St. Pennypacker 1980
Hackett, H. Berkeley 6th & Chestnut Sts. Lombard 4000
Haynes, S., Co., Inc. ..2013 Sansom St. Rittenhouse 8262
Home Comfort Heating Co. 1604 Fairmount Ave. Poplar 3452
Jellett, Stewart A., Co. ..1200 Locust St. Pennypacker 8992
Lewis, John W. .....3935 Sansom St. Evergreen 0530
Martens, A. D. ..Commercial Trust Bldg. Rittenhouse 0863
Miller, W. C. .....4019 Sansom St. Evergreen 8590
Nelson, Frank & Sons .....320 Budd St. Evergreen 4124
Roberts, Henry L. .....228 N. 16th St. Rittenhouse 7831
Simsohn, Julian S. ..Broad & Girard Ave. Poplar 7410
Skinner Bros. Mfg. Co., Inc. ..Pa. Bldg. Rittenhouse 7377
Stearns, W. I. .....560 N. 16th St. Poplar 9506
Sturtevant, B. F., Co. Thorne & Copewood Sts. Camden 4490
Thermolator Corp. .....345 N. 12th St. Walnut 4279

ENGINEERS—HYDRAULIC ENGINEERS

Birkinbine Engineering Offices Commercial Trust Bldg. Rittenhouse 0785

ENGINEERS—INDUSTRIAL ENGINEERS

Ballinger Eng. Appraisal Co. 12th & Chestnut Sts. Pennypacker 5800
Fisher, Wager .....Harrison Bldg. Rittenhouse 8826
Ford, Bacon & Davis, Inc. ..Morris Bldg. Rittenhouse 3166
Hertzler & Zook Co. ....552 N. 16th St. Poplar 4777
Heverle & Hay .....City Centre Bldg. Spruce 7848
Sherman Corp., Pa. ....1015 Chestnut St. Walnut 1267

ENGINEERS—LANDSCAPE ENGINEERS

Lewis & Valentine Co. ..Ardmore, Pa. Ardmore 88 Chester 4
Meehan, J. Franklin & Sons Hortter W. of Germantown Ave. Germantown 0298
Thorpe, Chester D. .....6533 Wister St. Germantown 1126

ENGINEERS—LIGHTING ENGINEERS

Dyer, W. E. S. .....Land Title Bldg. Rittenhouse 5354

ENGINEERS—MANAGEMENT ENGINEERS

Applied Management, Inc. Equitable Bldg. Pennypacker 3109
Sherman Corp. Pa. ....1015 Chestnut St. Walnut 1267

ENGINEERS—MARINE ENGINEERS

Atlantic Engineering Works 852 S. Swanson St. Lombard 8348

ENGINEERS—MECHANICAL ENGINEERS

Brown, M. J., Mfg. Co. ..2671 Salmon St. Regent 8473
Central Machine Co. ..7th & Wood Sts. Market 1671
Cresson-Morris Co. 18th St. & Allegheny Ave. Tioga 2330
Dyer, W. E. S. .....Land Title Bldg. Rittenhouse 5354
Hoffman-Henon Co. ....Finance Bldg. Rittenhouse 0378
Jellett, Stewart A., Co. ..1200 Locust St. Pennypacker 8992
Leopold, Chas. S. .....213 S. Broad St. Pennypacker 6430 Race 6535
Machine & Tool Designing Co. 706 Chestnut St. Walnut 6206
Malvern, J. Benjamin .....26 S. 15th St. Spruce 2977

ENGINEERS—MECHANICAL ENGINEERS—Continued

rogressive Engineering & Tool Co.
5601 Germantown Ave.
Germantown 5685

ublic Engineering & Construction Co.
2700 Germantown Ave.
Columbia 6675

msohn, Julian S. ..Broad & Girard Ave.
Poplar 7410

riune Machine Co. .....1132 Race St.
Walnut 5777

ENGINEERS—METALLURGICAL ENGINEERS

oleman, W. B. & Co.
15th & Wallace Sts.
Poplar 4648

ENGINEERS—MINING ENGINEERS

irkinbine Engineering Offices
Commercial Trust Bldg.
Rittenhouse 0785

nory, Lloyd T. .....4 S. 15th St.
Rittenhouse 0717

ENGINEERS—POWER ENGINEERS

msohn, Julian S. ..Broad & Girard Ave.
Poplar 7410

hila. Armature Works ....632 Race St.
Market 4600

ENGINEERS—PRODUCTION ENGINEERS

nerman Corp. .....1015 Chestnut St.
Walnut 1267

ENGINEERS—REFRIGERATING ENGINEERS

yer, W. E. S. .....Land Title Bldg.
Rittenhouse 5354

ENGINEERS—SANITARY ENGINEERS

lbright & Mebus .....1502 Locust St.
Pennypacker 2318

ggly, Harry J., Jr. ..2021 Chancellor St.
Spruce 0938

ENGINEERS—SANITARY ENGINEERS—Continued

Fuller & McClintock .....Penna. Bldg.
Rittenhouse 8721

Harrison, Mertz & Emlen, Inc.
5328 Greene St.
Germantown 9904

ENGINEERS—STEAM ENGINEERS

Reuss, Edw. H., Jr. ....30th & Race Sts.
Evergreen 2977

ENGINEERS—STRUCTURAL ENGINEERS

Deysher, Harvey M. ....709 Chestnut St.
Lombard 1617

Essick, Paul J......1511 Arch St.
Spruce 487

Gibson, W. Herbert .....Harrison Bldg.
Rittenhouse 1731

Hess, Harry C. .....10 S. 18th St.
Rittenhouse 7059

Martindale, Frank L. ..2216 Chestnut St.
Rittenhouse 1819

Priest, Ralph N. .....1627 Sansom St.
Rittenhouse 6090

ENGINEERS—TELEPHONE ENGINEERS

Bell Telephone Co. ..Engineering Dept.
Official 0050
(See advertisement page 4)

ENGINEERS—VENTILATING ENGINEERS

Bowers Bros. & Co. ....2015 Sansom St.
Rittenhouse 9322

ENGINEERS—WATER SUPPLY ENGINEERS

Franklin & Co. .....1420 Chestnut St.
Rittenhouse 1766

ENGINEERS—WELDING ENGINEERS

Welding Engineers, Inc. ..225 S. 15th St.
Pennypacker 2586
Regent 0481
Night Service
Germantown 5683
Ridley Park 1170-W
Glassboro 533-W

ENGINEERING INSTRUMENTS

Dietzgen, Eugene Co. ..1521 Sansom St.
Rittenhouse 9020 Race 5529
Williams, Browne & Earle
918 Chestnut St.
Pennypacker 7320 Main 7261

ENGINEERS' SUPPLIES

Defiance Sales Corp. .....1214 Arch St.
Spruce 8842
Watt's, John M., Sons ....120 Walnut St.
Lombard 1213

CIVIL ENGINEERS' SUPPLIES

Dietzgen, Eugene Co. ..1521 Sansom St.
Rittenhouse 9020
Warren-Knight Co. .....136 N. 12th St.
Locust 3984

EXCAVATING—STEAM SHOVEL

(See Contractors—Steam Shovel Contractors)

EXPANDED METAL

Consolidated Expanded Metal Co.
1083 Germantown Ave.
Market 1468 Park 4188
Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115

EXPANSION SHIELDS

Rawlplug Co. .....1509 Arch St.
Rittenhouse 2951

FACE BRICK

(See Brick—Face Brick)

FANS—ELECTRICAL

(See Electrical Devices)

FEED WATER HEATERS

(See Heaters—Feed Water Heaters)

FEEDWATER REGULATORS

(See Regulators—Feedwater Regulators)

FELTON-SIBLEY PAINTS

Felton-Sibley .....136 N. 4th St.
Market 3860 Main 6551

FENCES AND GATES—IRON

Acme Iron Works ....2619 W. York St.
Columbia 7918 Park 1476
Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Gensel, Fred, & Co. .....911 Vine St.
Walnut 0859 Race 3790
Pettit, Frank, Ornamental Iron Works.
1505 N. Mascher St.
Regent 9857 Park 4147
Simpson, John C. .....919 S. 46th St.
Woodland 5738
Wayne Iron Works .....Wayne, Pa.
Wayne 1124
Clopp, George B. .....2717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)
Anchor Post Fence Co.
Real Estate Trust Bldg.
Pennypacker 4633
Hand, Edw. L., & Co. .....521 Arch St.
Lombard 9007
Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

FENCE—HURDLE FENCE

Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

FENCE—WIRE FENCE

Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

FENCE—WIRE & IRON FENCE

Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

FENESTRA STEEL SASH

Detroit Steel Products Co.
1722 Ludlow St.
Rittenhouse 4937

FILING EQUIPMENT

General Fireproofing Co.
Packard Bldg.
Rittenhouse 2422

FILTERS—AIR FILTERS

General Air Filters Corp. ...The Bourse
Lombard 9300

FIRE BRICK
(See Brick—Fire Brick)

FIRE ALARMS

Auto-Call Co. .....1703 Chestnut St.
Rittenhouse 4995
Brownworth & Co. .....1611 Sansom St.
Rittenhouse 6156 Race 4305
Corona Fire Escape Co. ....269 S. 4th St.
Lombard 3115
Schwartz Bros. .....104 N. 8th St.
Lombard 8120 Main 5165

FIRE ALARMS—AUTOMATIC FIRE ALARMS
(See Sprinkler Systems)

FIRE APPARATUS

Amer. La France Fire Engine Co. of Pa.
25th & Westmoreland Sts.
Tioga 5436 Park 2339
Schwartz Bros. .....104 N. 8th St.
Lombard 8120 Main 5165
Virt & Knox Mfg. Co. ..23d & York Sts.
Columbia 6520 Park 5533
Castle, Jas. M., Inc. .....1718 Vine St.
Rittenhouse 5996

FIRE CLAY

Yardee, John S. E..704 S. Schuylkill Ave.
Locust 4725 Race 5035

FIRE DOORS
(See Doors—Fire Doors)

FIRE ESCAPES—IRON FIRE ESCAPES

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Montgomery Iron & Steel Co.
2500 Duncan St.
Delaware 4995 East 7905
(See advertisement page 324)
Popp, George B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)

FIRE ESCAPES—IRON FIRE ESCAPES—Continued

Noe, Wm. L., Co. .....2d & Oxford Sts.
Regent 4730 Park 4877
(See advertisement page 34)
Acme Iron Works ....2619 W. York St.
Columbia 7918 Park 1476
Aubel, F. & E. ...2503 Germantown Ave.
Columbia 8158 Park 2316
Brownworth & Co. ....1611 Sansom St.
Rittenhouse 6156 Race 4305
Baizley, John, Iron Works
514 S. Delaware Ave.
Lombard 2282 Main 8754
Hoffman, Chris., Inc. .....346 S. 4th St.
Lombard 2563 Main 2687
Corona Fire Escape Co. ...269 S. 4th St.
Lombard 3115
Contractors Steel Specialty Co.
30th & Walnut Sts.
West 2921

FIRE ESCAPES—ROPE FIRE ESCAPES

Brownworth & Co. ....1611 Sansom St.
Rittenhouse 6156 Race 4305
Rope Fire Escape Co. ...1628 Market St.
Rittenhouse 4920 Race 2192
Schwartz Bros. .....104 N. 8th St.
Lombard 8120 Main 5165

FIRE EXTINGUISHERS—AUTOMATIC FIRE EXTINGUISHERS
(See Sprinkler Systems—Automatic)

FIRE EXTINGUISHERS—HAND FIRE EXTINGUISHERS

Boyd Bros. .....1617 Sansom St.
Rittenhouse 8300 Race 7531
F. R. X. Mfg. Co. ..Comrcl. Trust Bldg.
Rittenhouse 4173
Fyr-Fyter Sales & Service
110 N. Delaware Ave.
Market 4275
National Fire Protection Co.
1617 Sansom St.
Rittenhouse 8300 Race 7531
Newell, A. J., Co. .....1505 Arch St.
Locust 0619 Race 2604
Castle, James M., Inc. .....1718 Vine St.
Rittenhouse 5996

FIRE SHUTTERS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316

FIREPLACE DAMPERS

(See Dampers—Fireplace)

FIREPLACE FIXTURES

(See Fixtures—Fireplace Fixtures)

FIREPLACE SCREENS

(See Screens—Fireplace Screens)

FOMITE FIRE EXTINGUISHERS

Castle, Jas. M., Inc. .....1718 Arch St.
Rittenhouse 5996

FIREPROOFING—ASBESTOS LUMBER

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

FIREPROOFING—ASBESTOS SHINGLES

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

FIREPROOFING—GYPSUM FIREPROOFING

Asher Fireproofing Co.
20th & Walnut Sts.
Rittenhouse 1359
Greenfield, Arthur, Inc.
Real Estate Trust Bldg.
Pennypacker 9367
Keystone Gypsum Fireproofing Corp.
North American Bldg.
Pennypacker 5545 Race 1965
Marks, H. E., Corp. .....Schaff Bldg.
Rittenhouse 2984
National Fireproofing Co.
Land Title Bldg.
Rittenhouse 4761 Race 2778

FIREPROOFING—GYPSUM FIREPROOFING—Continued

Oregon Concrete & Fireproofing Co.
Ritner & Woodstock Sts.
Oregon 2530
Structural Gypsum Corp.
Real Estate Trust Bldg.
Pennypacker 2630
U. S. Gypsum Co. .....Otis Bldg.
Rittenhouse 6161 Race 6681
Ebsary Gypsum Co.
Merchants Whse., 31st & Chestnut Sts.
Evergreen 9230 West 1024

FIREPROOFING—LINABESTOS

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

FIREPROOF MATERIAL

Taylor, A., Co. .....D St. ab. Erie Ave.
Regent 4024 Park 2391
(See advertisement page 54)
Asher Fireproofing Co.
20th & Walnut Sts.
Rittenhouse 1359

FITTINGS—ACID RESISTANT FITTINGS

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983

FIXTURES—BANK FIXTURES

Kramer Woodworking Co.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
(See advertisement page 22)
Stremme & Schweder .....4270 Paul St.
Delaware 4137 East 8953

FIXTURES—BAR FIXTURES

Hollweck & Bauer .....304 Master St.
Regent 1519 Park 3505

FIXTURES—BATH ROOM FIXTURES

Belfi Bros. & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Golco Sanitary System, Inc.
Emerald & Hagert Sts.
Regent 0643 East 7224

FIXTURES—BATH ROOM FIXTURES—Continued

Lehman, L. H. .....1210 N. 8th St.
Regent 6069 Park 1888
Phila. Porcelain Products Co.
1730 N. 5th St.
Columbia 7816
Crane & Co. .....212 S. 13th St.
Pennypacker 1250 Race 4463

FIXTURES—GAS AND ELECTRIC FIXTURES

Biddle-Gaumer Co...3846 Lancaster Ave.
Evergreen 0760 West 2881
Dougherty, J. F. .....5727 Chester Ave.
Woodland 2214
Frechie, Jos. E., & Co., Inc. .27 N. 7th St.
Lombard 7730 Main 7849
Henderson, N. E., & Son, Inc.
1320 Race St.
Locust 0272
Horn & Brannan Mfg. Co.
427 N. Broad St.
Poplar 4470 Race 7118
Kyle, B. T., & Co. ...16th & Master Sts.
Stevenson 7149 Park 1538
Lewis & Lamont..644 E. Allegheny Ave.
Regent 1124 East 9046
Philadelphia Mfg. Co.
Howard & Montgomery Aves.
Regent 3624 Park 2915
Sklar, Morris, Co. .....41 N. 7th St.
Lombard 8548 Main 5738
Staman & Dickey Co. ....127 S. 22d St.
Rittenhouse 9297 Race 7939
Star Electric Fixture Co.
623 Commerce St.
Lombard 7825 Main 7308
Stewart, Frank H., Electric Co.
37 N. 7th St.
Lombard 7740 Main 8301
Uhr Electric Supply Co. ..19 N. 7th St.
Lombard 0197 Main 1664
Voigt Co., Inc. .....1743 N. 12th St.
Stevenson 0600 Park 4155
Cass, Philip, & Co. .....40 N. 5th St.
Lombard 9100 Main 7776

FIXTURES—FIREPLACE FIXTURES

Ambler-Rankin Co. .....1709 Arch St.
Rittenhouse 7752 Race 1387
Fowler, Addison .....14 N. Front St.
Market 2526

FIXTURES—FIREPLACE FIXTURES—Continued

Miller, J. Franklin, Inc.
1720 Chestnut St.
Rittenhouse 5817 Race 7514
Millership, Thomas E. ....3241 Gtn. Ave.
Tioga 3198
Williamson & Messinger
2715 N. Broad St.
Columbia 1705

FIXTURES—LIGHTING FIXTURES

Ward, Robert J. & Co. ..247 S. 13th St.
Pennypacker 5951

FIXTURES—STORE FIXTURES

American Woodworking Co.
6509 Magnolia Ave.
Germantown 8445
Claitman, M. .....309 Reed St.
Lombard 4251
England, Frank A., Co.
1124 Washington Ave.
Oregon 1398 Race 2463
Grand Rapids Store Equipment Co.
Widener Bldg.
Rittenhouse 8139
Hollweck & Bauer 304 Master St.
Regent 1500 Park 3505
Kramer & Sons ..1328 Germantown Ave.
Regent 4149
Lancaster Store & Office Fixture Co.
3935 Lancaster Ave.
Evergreen 6680
Patten Furniture Co. .....1129 Arch St.
Locust 4070 Race 4209
Rust, Harry R., Inc. ....724 Ludlow St.
Lombard 6877 Race 1934
Sher Show Case Co. .....46 S. 2d St.
Lombard 7513 Main 6356
South Phila. Woodworking Co.
915 Snyder Ave.
Jackson 1517
Welch-Wilmarth Corp. ..Jefferson Bldg.
Walnut 3010
Kramer Woodworking Co.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
Kuskey Mfg. Co.
Columbia Ave. & Howard St.
Regent 1500 Park 1144
Penn Cabinet Co. ..213 S. Jessup Street
Pennypacker 6408

FLAGS—UNITED STATES FLAGS

Blanckensee, Leon & Co. ..217 Arch St.
Market 0931

FLAGS—UNITED STATES FLAGS—Continued

Hoffman Crown Mfg. Co. 312 Market St.
Lombard 0531 Main 1727
Humphreys, R. A., Sons, Inc.
1021 Callowhill St.
Walnut 6020
Kenney Co. .....13 N. 13th St.
Locust 5847
Lehmberg, Wm. & Sons ..138 N. 10th St.
Walnut 2044
Metropolitan Flag & Decorating Co.
6115 Ellsworth St.
Allegheny 0766

FLAG POLES—STEEL FLAG POLES

Lingo, John E. & Son
28th St. & Buren Ave., Camden, N. J.
Camden 487
Hassler, Jack .....1361 Ridge Ave.
Poplar 3808
Humphreys, R. A., Sons, Inc.
1021 Callowhill St.
Walnut 6020
McPherson, C. D. .....2338 Gtn. Ave.
Columbia 4874
Orth, G. P. ..523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 34)
Van Duser, A. B. ..1247 N. Warnock St.
Stevenson 7560

FLAG POLES—WOOD FLAG POLES

Hassler, Jack .....1361 Ridge Ave.
Poplar 3808
Orth, G. P. ..523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 34)
Humphrys, D. C., Co. ..909 Filbert St.
Walnut 0510 Race 1075

FLOORING—ACID RESISTANT FLOORING

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)
Rulon, Ralph V., Inc.
Hunting Park Ave. at E. St.
(See advertisement page 142)

FLOORING—ASPHALT FLOORING

Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
(See advertisement page 142)

FLOORING—ASPHALT MASTIC FLOORING

Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
(See advertisement page 142)
Foster, Benjamin & Co.
20th & Venango Sts.
Tioga 4556 Park 5554

FLOORING—COMPOSITION FLOORING

Magnesite Mineral Flooring Co.
2078 Margaret St.
Jefferson 2478
Marbleloid Co. .....Weightman Bldg.
Rittenhouse 3972 Race 4653
Mineral Comp. Flooring & Products Co.
1516 N. Bailey St.
Stevenson 7393 Park 1502
Mineralite Flooring Co.
402 E. Chelten Ave.
Germantown 2011
National Stucco & Flooring Co.
5540 Vine St.
Granite 4466 West 1420
Neolithic Flooring Co.
3160 Kensington Ave.
Garfield 2272 East 9002
Phila. Mineral Flooring & Prod. Co., Inc.
Tioga & Aramingo Sts.
Delaware 2013
Selby, Battersby & Co. ....810 Noble St.
Market 1815 Main 9172

FLOORING—COMPOSITION CORK FLOORING

Kennedy, David E., Inc.
Real Estate Trust Bldg.
Pennypacker 2851 Race 2658

FLOORING—CORK FLOORING

Bonded Floor Co., Inc. ....Morris Bldg.
Rittenhouse 0340
Fritz & La Rue, Inc. ..2025 Cuthbert St.
Rittenhouse 3753
Heaton, S. W. .....1802 Chestnut St.
Rittenhouse 1933
Kennedy, David E., Inc.
Real Estate Trust Bldg.
Pennypacker 2851
Selby, Battersby & Co. ....810 Noble St.
Market 1815 Main 9172

FLOORING—DURAFLEX FLOORING

Duraflex Co. .....1615 Spruce St.
Pennypacker 1671

FLOORING—FIREPROOF FLOORING

Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 44)

FLOORING—HARDWOOD FLOORING

Advance Hardwood Flooring Co.
475 N. 6th St.
Market 5573

American Parquetry Floor Co.
2929 N. 8th St.
Tioga 8647 Park 3479

Arrow Flooring Corp.
Bankers Trust Bldg.
Pennypacker 5498 Race 9665

Atlas Flooring Co. .....452 N. Holly St.
Baring 8982

Callaghan, Fred .....131 N. Bross St.
Sherwood 6530

Carson, Robert .....2747 N. 20th St.
Columbia 6741

Columbia Flooring Co...23d & Firth Sts.
Columbia 5750

Courduff, Albert & Charlie
223 W. Indiana Ave.
Regent 8292

Daemer, John .....1318 W. Seltzer St.
Columbia 6581

Deeney, John & Son ....2244 Pierce St.
Jackson 0997

De Stefano, A. & Co. 4018 Cambridge St.
Baring 0759

Federal Hardwood Floor Co.
1344 Ellsworth St.
Jackson 0146

Ferrence, J. M. & Co. 4043 Powelton Ave.
Evergreen 1786

Fritz & La Rue, Inc. ..1615 Chestnut St.
Rittenhouse 5372

Geier, John .....Broad & Courtland Sts.
Wyoming 9333

Gohn, Peter .....1848 N. Leithgow St.
Regent 4657

FLOORING—HARDWOOD FLOORING

Hartman, John
Griffith St. & Bustleton Pike
Bustleton 8362

FLOORING—HARDWOOD FLOORING—Continued

Heaton, S. W. .....1802 Chestnut St.
Rittenhouse 1933

Hendrick, T. M. .....2127 Pratt St.
Jefferson 5196

Hill, John .....2632 N. Waterloo St.
Regent 6252

Kensington Hardwood & Parquetry Floor Co.
2333 E. Allegheny Ave.
Regent 2923

Keystone Hardwood Parquetry Floor Co.
6046 Walnut St.
Sherwood 2949

Miller, C. Edgar, Jr.
1433 N. Sydenham St.
Stevenson 7139
Same .....4751 N. Camac St.
Wyoming 1422

Miller, E., & Son .....1707 N. 52d St.
Belmont 5394

Pennsylvania Parquetry Floor Co.
5721 Chew St.
Germantown 0126

Perlman, J. ..5409 W. Montgomery Ave.
Belmont 2393

Sweeney, Owen ....2301 W. Hagert St.
Columbia 2550

Sweigart Bros., Inc. .....3415 N. 2d St.
Regent 5781 Park 4428

Adamson-Rowland Co.
7120 N. Broad St.
Majestic 1164

Amboy Hardwood Flooring Co.
121 N. 9th St.
Walnut 7849

Geiger, A. D. .....1623 N. 59th St.
Belmont 9195

FLOORING—INDUSTRIAL FLOORING

Rulon, Ralph V., Inc.
Hunting Park Ave. at E St.
(See advertisement page 142)

FLOORING—LINOLEUM FLOORING

American Window Shade & Linoleum Co.
60th St. & Hazel Ave.
Sherwood 1715

Bonded Floors Co., Inc. ...Morris Bldg.
Rittenhouse 0340

FLOORING—MASTIC FLOORING

Carson Waterproofing Co.
1700 Walnut St.
Pennypacker 9265 Race 5148
(See advertisement page 146)
Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 44)
Martin & Breen, Inc. ..1613 Sansom St.
Rittenhouse 1554 Race 1190
Foster, Benj., Co. ..20th & Venango Sts.
Tioga 4556 Park 5554
Selby, Battersby & Co. ....810 Noble St.
Market 1815 Main 9172
Marbleloid Co. .....Weightman Bldg.
Rittenhouse 3972 Race 4653

FLOORING—MINERAL FLOORING

Magnesite Mineral Flooring
2078 Margaret St.
Jefferson 2478
Marine Decking & Flooring Co.
3502-10 Aramingo Ave.
Jefferson 2300
Mineral Composition Flooring & Products Co.
1516 N. Bailey St.
Stevenson 7393 Park 1502
Phila. Mineral Flooring & Products Co., Inc.
Tioga & Aramingo Sts.
Delaware 2013
Boyle, John .....402 E. Chelten Ave.
Germantown 4011

FLOORING—PARQUETRY FLOORING

Amboy Hardwood Flooring Co.
1938 N. Myrtlewood St.
Columbia 7377
Courduff, Albert ....223 W. Indiana Ave.
Regent 8292
Daemer, John .....2813 N. Broad St.
Columbia 6581
Fritz & La Rue, Inc. ..1615 Chestnut St.
Rittenhouse 5372
Geiger, A. F. .....1623 N. 59th St.
Belmont 9195
Getz, Max F. .....5614 Sansom St.
Sherwood 1834
Ostendorf, Wm. G. ....3126 N. Broad St.
Tioga 4327
Phila. Floor Laying Co.,.1637 S. 55th St.
Woodland 0439

FLOORING—PARQUETRY FLOORING—Continued

Steinman, Benj. .....59th & Ludlow Sts.
Granite 3044 West 2304
Williamson & Messinger
5715 N. Broad St.
Columbia 1705

FLOORING—RUBBER TILE FLOORS

American Tile & Rubber Co.
313 Vine St.
Market 5066
Bonded Floors Co., Inc. ...Morris Bldg.
Rittenhouse 0340
Federal Floor Co. ....1344 Ellsworth St.
Jackson 0146
Heaton, S. W. .....1802 Chestnut St.
Rittenhouse 1933
Kennedy, David E., Inc.
Real Estate Trust Bldg.
Pennypacker 2851 Race 2658
Selby, Battersby & Co. ....810 Noble St.
Market 1815 Main 9172
Sweigart Bros., Inc. .....3415 N. 2d St.
Regent 5781 Park 4428
Hamilton Rubber Mfg. Co.
2317 Walnut St.
Locust 1133

FLOORING—TILE FLOORING

Hood Tile Co. ....13th & Chestnut Sts.
Pennypacker 7620 Race 0018
Morgal, Harry F. ..4335 Lancaster Ave.
Baring 0769

FLOOR DRESSING

Fritz & La Rue, Inc. ...2025 Cuthbert St.
Rittenhouse 3753
Victory Chemical Co.
148 Fairmount Ave.
Market 5676 Main 6244

FLOOR HARDENERS

Hydroseal Waterproofing Co.
1536 N. Delaware Ave.
Market 4525
(See advertisement page 101)

FLOOR LAYING

Arrow Flooring Corp..Bankers Tr. Bldg.
Pennypacker 5498 Race 9665

FLOOR LAYING—Continued

rings, Martin .....3522 N. Marvine St.
Michigan 4550
ritz & La Rue, Inc. ...2025 Cuthbert St.
Rittenhouse 3753
hila. Floor Laying Co. ..1637 S. 55th St.
Woodland 0439

FLOOR LIGHTS

ssociated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

FLOOR MACHINES

llison, C. L., Co. .....1611 Sansom St.
Rittenhouse 6329
Hoffman, F. W., & Co., Inc. .35 S. 4th St.
Lombard 9360 Main 7278
onsell Floor Mach. Co. ..154 N. 7th St.
Market 6137

FLOOR PLATES—IRON FLOOR PLATES

ssociated Iron Works ...1233 Arch St.
Locust 3047 Race 4325

FLOOR POLISHING MACHINES

Herr, John, Mfg. Co. .....44 N. 4th St.
Market 2130
onsell Floor Mach. Co.... 154 N. 7th St.
Market 6137

FLOOR SURFACING AND RESURFACING MACHINES

hila. Floor Laying Co. ..1637 S. 55th St.
Woodland 0439
onsell Floor Mach. Co. ..154 N. 7th St.
Market 6137
tonhard Co. .....620 S. Delaware Ave.
Lombard 9578

FLUES—VENTILATING FLUES—ACID RESISTANT CHEMICAL STONEWARE

Knight, M. A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

FLUE LINING—TERRA COTTA

Abbey Co. .....Commercial Trust Bldg.
Rittenhouse 3167
Progressive Clay Co. .....Bulletin Bldg.
Spruce 3176

FLY SCREENS

(See Screens—Window Screens)

FORGES

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 0859
(See advertisement page 36)

FORMS—CONCRETE

(See Concrete Forms)

FOUNDATIONS

Foundation & Construction Co.
1320 Race St.
Locust 0272
(See advertisement page 44)
Underpinning & Foundation Co.
Finance Bldg.
Rittenhouse 0219

FREIGHT ELEVATORS

(See Elevators—Freight Elevators)

FRIGIDAIRE—ELECTRIC REFRIGERATION

Frigidaire Elec. Refrigerator Distributors
810 N. Broad St.
Poplar 9613

FURNACES—GAS-FIRED FURNACES

Bryant Heater & Mfg. Co. ..1518 Vine St.
Rittenhouse 0916
(See advertisement page 74)
Hershey, John C. .....128 N. 21st St.
Rittenhouse 0209

FURNACES—HOLLAND FURNACES

Holland Furnace Co. .....29 W. 4th St.
Chester 1839
Holland Furnace Co. ....1713 S. 20th St.
Jackson 2830
Holland Furnace Co. ....830 N. Broad St.
Poplar 5035
Holland Furnace Co. ....5549 Gtn. Ave.
Germantown 5629
Holland Furnace Co. ..1268 Haddon Ave.
Camden 5853
Holland Furnace Co. ..405 W. Main St.
Norristown 1891
Holland Furnace Co. ....3506 Rhawn St.
Holmesburg 2390

FURNACES—PIPELESS FURNACES

Caloric Furnace Agency ..1034 Arch St.
Walnut 5843 Race 9512

FURNACES—WARM AIR FURNACES

Bryant Heater & Mfg. Co. ..1518 Vine St.
Rittenhouse 0916 Race 9533
(See advertisement page 74)
Cox, Abram Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Holland Furnace Co. ..830 N. Broad St.
Poplar 5035
Phila. Furnace Co. ....1812 Chestnut St.
Rittenhouse 8763

FURNACE GRATES

(See Grates—Furnace Grates)

FURNITURE—STEEL FURNITURE

Ohnstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)

FRAMES—DOOR FRAMES

(See Millwork)

FRAMES—WINDOW FRAMES

(See Millwork)

GARAGE BUILDERS

Aldine Garage .....2027-39 Sansom St.
Rittenhouse 6347
Same .....252 S. 9th St.
Walnut 7563
Bailey, Edward J. & Son
Sepviva & Duncan Sts.
Delaware 4338 East 8444
Concrete Construction Co.
1772 N. Bodine St.
Columbia 8545
Crawford Roofing Supply Co.
2348 N. 15th St.
Columbia 9269
Ferguson, John H. 4922 Cedar Ave.
Sherwood 1211
Gregory & Miller .....536 Hermit St.
Manayunk 1374
Martin Steel Products Co. ..17 N. 21st St.
Rittenhouse 5567
Primax Construction Co.
4445 Sansom St.
Evergreen 2714

GARAGE DOORS

(See Doors—Garage Doors)

GARAGES—PORTABLE GARAGES

(See Buildings—Portable Iron & Steel)

GARAGE DOOR OPERATORS

Quincy Elevator Gate Co. ..Quincy, Ill.

GARBAGE RECEIVERS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

GARBAGE RECEIVERS—UNDERGROUND GARBAGE RECEIVERS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement Page 118)

GARFORD MOTOR TRUCKS

Garford Motor Truck Co.
2308 Chestnut St.
Rittenhouse 1922 Race 7809

GAS AND ELECTRIC FIXTURES

(See Fixtures—Gas and Electric)

GAS METERS

(See Meters—Gas Meters)

GAS FIRED BOILERS

(See Boilers—Gas Fired)

GAS FIRED FURNACES

(See Furnaces—Gas Fired Furnaces)

GAS FIRED RADIATORS

(See Radiators—Gas Fired)

GATES—ELEVATOR GATES

(See Elevator Gates)

GATES—ENTRANCE GATES

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

GATES—FOLDING GATES

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

GATES—HAND WROUGHT

Ornamental Iron
Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

GATES—IRON GATES

(See Fence and Gates—Iron)

GATES—ORNAMENTAL BRONZE

Shannon Metalcraft Corp. ..11 Letitia St.
Walnut 2396
(See advertisement page 74)

GAS RANGES

(See Ranges—Gas Ranges)

GAS STOVES

(See Stoves—Gas Stoves)

GAS WATER HEATERS

(See Water Heaters—Gas-Fired Water Heaters)

GENERAL CONTRACTORS

(See Contractors—General Contractors)

GENERAL ELECTRIC REFRIGERATORS

Burns, Judson C., Inc.
11th & Chestnut Sts.
Rittenhouse 1500

GENERATORS—ELECTRIC

(See Electric Machinery—Generators—Electric)

GLASS—ART GLASS

A. A. Art Stained & Leaded Glass Works
2225 W. Berks St.
Columbia 9739
Art Leaded Glass Shop ..866 N. 10th St.
Stevenson 6381

GLASS—ART GLASS—Continued

Oesterle Leaded Glass Works
327 N. 11th St.
Walnut 0678
Reeves, Elmer C. .....3610 N. 16th St.
Michigan 9814
Roberts Art Glass Works
4324 Lancaster Ave.
Evergreen 7668 West 1835
Smith, H. J. & Sons ....3216 N. 16th St.
Tioga 2918
Uhrig Bros. .....3039 N. 5th St.
Regent 1557
West Phila. Art Glass Works
4219 Market St.
Baring 0200 West 3338

GLASS—BENT GLASS

Buten, M. & Sons .....1834 South St.
Pennypacker 8466 Race 9975

GLASS—LEADED GLASS

Art Leaded Glass Shop ..866 N. 10th St.
Stevenson 6381
Columbia Stained Glass Works
866 N. 10th St.
Stevenson 6381 Park 3890
Newell, Jas. M. .....6037 Old York Rd.
Waverly 6744
Oesterle Leaded Glass Works
327 N. 11th St.
Walnut 0678 Race 7169
Philadelphia Ornamental Glass Works
611 N. 5th St.
Market 1934
Uhrig Bros. .....3039 N. 5th St.
Regent 1557

GLASS—PLATE GLASS

Bennett, H. L. .....The Bourse
Lombard 1214 Main 8430
Capital Plate Glass Co. ....226 N. 16th St.
Rittenhouse 3317
Gerard & Taylor .....6210 Race St.
Sherwood 3226
Hires-Turner Glass Co.
30th & Walnut Sts.
Evergreen 8584 West 1723
Southwark Glazing Co. ..1824 S. 6th St.
Oregon 4931 Main 2719
Stott-Hecht Glass Works 429 N. 6th St.
Market 0616 Main 8789
Western Glazing Co. .....813 S. 5th St.
Lombard 2604 Main 5475

GLASS—STAINED GLASS

Columbia Stained Glass Works
966 N. 10th St.
Stevenson 6381 Park 3890
D'Ascenzo Studios ....1604 Summer St.
Rittenhouse 8897
Oesterle Stained Glass Works
327 N. 11th St.
Walnut 0678
Phila. Ornamental Glass Works
611 N. 5th St.
Market 1934
Smith, H. J. & Sons ....3216 N. 16th St.
Tioga 2918
West Phila. Art Glass Works
4219 Market St.
Baring 0200

GLASS—WINDOW GLASS

Bennett, H. L. .....The Bourse
Lombard 1214 Main 8430
Buten, M. & Sons .....1834 South St.
Pennypacker 8466
Hires-Turner Glass Co.
30th & Walnut Sts.
Evergreen 8584 West 1723
Stott-Hecht Glass Works .429 N. 6th St.
Market 0616 Main 8789

GLASS—WIRE GLASS

Hires-Turner Glass Co.
30th & Walnut Sts.
Evergreen 8584 West 1723
Penna. Wire Glass Co. ....Penna. Bldg.
Rittenhouse 9431 Race 7153

GLASS PAVEMENTS

(See Pavements—Glass Pavements)

GLAZIERS

Ace Glazing Co. ..4356 Germantown Ave.
Wyoming 0356
New York Glazing Co.
2230 N. Bouvier St.
Columbia 4402
Ridge Glass Works ....1333 Ridge Ave.
Poplar 7129 Race 3882
Union Glazing Co. .....906 Cherry St.
Walnut 1681 Race 2666
Phila. Glazing Co. ....3d & McKean Sts.
Oregon 1548 Main 5903

GLEN GERY SHALE BRICK

Glen Gery Shale Brick Co.
Stephen Girard Bldg.
Rittenhouse 6825 Race 9648

GRAHAM BROS. MOTOR TRUCKS

Thornton-Fuller Auto Co.
24th & South Sts.
Spruce 6735

GRANDSTANDS

Wayne Iron Works Co. ....Wayne, Pa.
Wayne 1124

GRANITE

Dodds, John A., Inc. ..2929 Ellsworth St.
Oregon 0764 Race 6979
(See advertisement page 128)
Herb, M. .....15th & Haines Sts.
Majestic 0363
Jorgensen, C. F. ....1432 W. Norris St.
Stevenson 0497

BUILDING BLOCKS—GRANITE BUILDING BLOCKS

Meehan, John & Son ..916 W. Dakota St.
Diamond 9416 Park 1057

GRANITE FINISHING

Dodds, John A., Inc...2929 Ellsworth St.
Oregon 0764 Race 6979
(See advertisement page 128)

GRATES—BOILER GRATES

Webster, Howard J. .....Harrison Bldg.
Rittenhouse 1731

GRATES—ELECTRIC GRATES

Electrocoal Grate Co. ....635 Market St.
Lombard 6712

GRATES—FURNACE GRATES

Fulweiler Co. .....1700 Walnut St.
Pennypacker 6067
Hetherington Bridge Grate Co.
1718 Sansom St.
Rittenhouse 6557 Race 1325
Standard Boiler & Tank Works
1922 Callowhill St.
Spruce 3661 Race 1018

GRATINGS—IRON GRATINGS

rchitectural Steel Engineering Co., Ltd.
1518 N. 13th St.
Stevenson 7058 Park 4124
rowhead Gratings Co.
1505 N. Mascher St.
Regent 9857
aw-Knox Co., Inc. .....Widener Bldg.
Rittenhouse 5728
ndrick Mfg. Co. .....Harrison Bldg.
Rittenhouse 7874
i Lok Co. .....1700 Walnut St.
Pennypacker 4747
ard, Jos. T., Co. .....5809 Baynton St.
Germantown 3555
(See advertisement page 146)
ving Iron Works ....1015 Chestnut St.
Walnut 3010
artenby, Harry A.
1823 Brandywine St.
Poplar 8660

GRATINGS—AREA GRATINGS

ssociated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

GRAVEL

hila. Transportation & Lighterage Co.
119 Walnut St.
Lombard 0178 Main 4394
an Sciver Corp. ..24th St. bel. Parkway
Rittenhouse 6610 Race 2421
arner, Chas., Co. ..Franklin Tr. Bldg.
Rittenhouse 0842 Race 3379

GRAVITY CONVEYORS

(See Conveyors—Gravity Conveyors)

GREENHOUSES

itchings & Co. ....Oak Lane Tr. Bldg.
Waverly 0231
ing Construction Co. ....14 N. 60th St.
Granite 4324
ord & Burnham Co. ..Land Title Bldg.
Rittenhouse 5291

GRILLES—BRASS & BRONZE GRILLES

ylvester, W. H., & Sons
1807 N. Howard St,
Garfield 0611
(See advertisement page 307)

GRILLES—BRASS & BRONZE GRILLES—Continued

Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Gensel, Fred & Co. .....911 Vine St.
Walnut 0859 Race 3790

GRILLES—IRON GRILLES

Sylvester, W. H., & Son
1807 N. Howard St.
Garfield 0611
(See advertisement page 307)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316

GRILLE—ORNAMENTAL BRONZE

Shannon Metalcraft Corp....11 Letitia St.
Walnut 2396
(See advertisement page 74)

GRILLES—RADIATOR GRILLES—RECESSED

Gerken Co., The J. D. ...Jefferson Bldg.
Walnut 0686
(See advertisement page 117)

GRILLES—RADIATOR GRILLES—HAND WROUGHT ORNAMENTAL IRON

Shannon Metalcraft Corp....11 Letitia St.
Walnut 2396
(See advertisement page 74)

GRILLES—WIRE GRILLES

Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316

GRILLES—WOVEN METAL GRILLES

Newell, A. J., Co. .....1505 Arch St.
Locust 0619 Race 2604

GRINDERS

Atlas Iron & Steel Co. ...1536 Dela. Ave.
Regent 0890 East 8959
(See advertisement page 36)

GRINNELL AUTOMATIC SPRINKLERS

Grinnell Co., Inc. .....414 Walnut St.
Lombard 6794 Main 5182

GROUND BRICK

(See Brick—Ground Brick)

GUARDS—MACHINERY GUARDS

Atlas Metal Construction Co.
708 N. Bodine St.
Market 4917
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Consolidated Expanded Metal Cos.
1083 Germantown Ave.
Market 1468 Park 4188
Drieling, G. A., Co...1716 N. Amer. Bldg.
Columbia 2107
Fairmount Metal Const. Co.
408 Wallace St.
Market 3816
Industrial Products Co.
3729 Old York Rd.
Wyoming 6797
Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115
Kastrup, Charles .....144 Wolf St.
Jackson 1279

GUARDS—WINDOW GUARDS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

GYPSUM BLOCKS

Keystone Gypsum Fireproof Corp.
North American Bldg.
Pennypacker 5545 Race 1965
National Fireproofing Co.
Land Title Bldg.
Rittenhouse 4761 Race 2778
Structural Gypsum Corp.
Real Estate Trust Bldg.
Pennypacker 2630
U. S. Gypsum Co. .....Otis Bldg.
Rittenhouse 6161 Race 6681
Venzie, F. M., Co.
2612 W. Huntingdon St.
Columbia 5482 Park 5317

GRANITE

Dodds, John A., Inc...**2929 Ellsworth St.**
Oregon 0764 Race 6979
(See advertisement page 128)
Holmesburg Concrete Co.
Welsh Rd. & Crispen St., Holmsbg., Pa.
Holmesburg 1014
(See advertisement page 112)
Ghee, Wm., & Son .....2629 N. 34th St.
Columbia 6260
Maxwell's Sons, John
30th St. bel. Spruce St.
Evergreen 2304 West 1188
Meehan, John, & Son .916 W. Dakota St.
Diamond 9416 Park 1057

GRANITE FINISHING

Dodds, John A., Inc...**2929 Ellsworth St.**
Oregon 0764 Race 6979
(See advertisement page 128)

GUARDS—MACHINE GUARDS

Fairmount Metal Construction Co.
408 Wallace St.
Market 3816

HARDWARE—BUILDERS' HARDWARE

Corbin, P. & F. .....Finance Bldg.
Rittenhouse 1134 Race 2758
Cusack, Howe Co. .....1004 Arch St.
Walnut 1004 Race 5781
Fifer & Beatty ....Front & Lehigh Ave.
Regent 1676 East 8467
Henderson, N. E. & Son, Inc.
1320 Race St.
Locust 0272 Race 3314
Hoffman Casement Hardware Co.
Lincoln Bldg.
Rittenhouse 2795
Soeffing, Adolph & Co. ....833 Arch St.
Walnut 0192 Main 2765
Ace Hardware Mfg. Corp. 447 N. 12th St.
Poplar 5312 Race 9557

HARDWARE—CABINET HARDWARE

Noblit Bros. Co. .....222 S. 2d St.
Lombard 3006 Main 5981

HARDWARE—GENERAL HARDWARE

Central Hardware Co. .....1716 Vine St.
Rittenhouse 8694 Race 1314
Commerce Hardware & Supply Co.
523 Commerce St.
Lombard 8149
Cusack Hardware Co. .....1004 Arch St.
Walnut 1004 Race 5781
Fifer & Beatty ....Front & Lehigh Ave.
Regent 1676 East 8567
Hanson, E. M. & Co. ....130 N. 4th St.
Market 5280 Main 7381
Henderson, N. E. & Son, Inc.
1320 Race St.
Locust 0272 Race 3314
Kensington Hardware & Supply Co.
3547 Frankford Ave.
Jefferson 8686
Kramer Hardware Co. ..4136 Market St.
Baring 8506
Mort Supply Co. ..4th St. & Girard Ave.
Market 4426 Park 4923
Murta, Appleton & Co.
12th & Sansom Sts.
Pennypacker 4760 Race 1696
Sees & Faber Co. ....2008 N. Front St.
Regent 0530 Park 2761
Shannon, J. B., Co. .....816 Chestnut St.
Walnut 2596 Main 4981
Shannon, J. Jacob Co. ..1744 Market St.
Rittenhouse 1744 Race 1744
Supplee-Biddle Hardware Co.
517 Commerce St.
Lombard 8200 Main 4801

HARDWOOD FLOORING

(See Flooring—Hardwood Flooring)

HARDWOOD LUMBER

(See Lumber—Hardwood Lumber)

HAULING—ASHES AND DEBRIS REMOVAL

McGurk, Francis, P. J.
N. E. Cor. 2d & Columbia Ave.
Regent 3288

HAULING—HEAVY HAULING

Adelphia Rigging Co. ..2207 N. 28th St.
Diamond 3946
Belmont Autc Trucking ....6118 Pine St.
Allegheny 3900 West 3471

HAULING—HEAVY HAULING—Continued

Benjamin Bros. ....327 N. American St.
Market 0373 Main 6648
Bolger, Andrew, Co. .....232 Arch St.
Market 0210 Main 9114
Boyce, J. J. & Son ....121 N. Front St.
Market 4880
Britt, P. F. .....508 Salmon St.
Regent 7084
Burgstahler, L. R. ....5810 Keystone St.
Jefferson 5913
Cavanaugh, J. H. .....1420 Vine St.
Locust 6802
Clayman, B. & Sons.....212 N. 10th St.
Walnut 3205 Race 3467
Garland, Ephriam ....1863 N. Taylor St.
Stevenson 8761
General Contracting Co. ..2101 S. 68th St.
Woodland 8862
Henderson Trucking & Rigging Corp.
2514 Lombard St.
Locust 4960 Race 7192
Penn Hall Trucking Co. ..2515 Moore St.
Jackson 3105
Purtell Bros. .....Marine Bldg.
Lombard 4666
Reilly Bros. .....2327 W. Sergeant St.
Columbia 6024
Stradling, C. H. ....2819 W. Fletcher St.
Diamond 5199 Park 1095

HEATERS—ELECTRIC HEATERS

(See Electric Devices—Heaters—Electric)

HEATERS—FEED WATER HEATERS

Griscom-Russell Co. ..Land Title Bldg.
Rittenhouse 1880
Ross Heater & Mfg. Co. ..254 S. 15th St.
Pennypacker 4871
Wheeler Condenser & Engineering Co.
Packard Bldg.
Rittenhouse 1182
Worthington Pump & Machinery Corp
N. American Bldg.
Pennypacker 0284

HEATERS—HOT AIR HEATERS

Consall's, Wm. S., Sons ..3826 Market St.
Evergreen 7050
Bruce, Geo. W. .....2120 S. 19th St.
Oregon 2164

HEATERS—HOT AIR HEATERS—Continued

Callahan, Charles .....142 S. 3d St.
Lombard 7540 Main 1962
Eisemann, Conrad D. ..5233 Oxford Ave.
Delaware 1640 East 8180
Gara-McGinley Co. .....218 N. 13th St.
Spruce 3896 Race 7054
Hallinan, James F. .....5218 Vine St.
Sherwood 9300 West 1915
Kisterbock, J. & Son ....1342 Ridge Ave.
Poplar 2500 Race 7178
Long, James N., Co. ....1342 Ridge Ave.
Poplar 2500 Race 7178
Lukens, Thompson H. ....321 S. 13th St.
Pennypacker 5983 Race 4177
Makin Heating Co. ....2019 Sansom St.
Rittenhouse 3875 Race 5060
Modern Home Rebuilders Penna.
3314 Lancaster Ave.
Evergreen 7900
Quigley, Jas. J. & Son..1342 Ridge Ave.
Poplar 2500 Race 7178
Reynolds, J. & Son ....1613 Filbert St.
Rittenhouse 4956 Race 3625
Dussinger, M. F. .....625 E. Hilton St.
Garfield 3846
Engle, Benj. .....1232 N. 2d St.
Garfield 2574
Forrest, Richard ..Mascher & Norris Sts.
Regent 1870
Freeman, Wm. .....2407 S. 10th St.
Oregon 9271
Garraty, Jas. F. Son ....736 N. 63d St.
Belmont 7015
Garrett, Geo. N. .....543 N. 8th St.
Market 2424
Gormly, P. Co. .....155 N. 10th St.
Walnut 0561 Race 2793
Lyster Contracting Co.
3732 Powelton Ave.
Evergreen 5454 West 2641
Martin, Warren S. ....4639 Oakland St.
Jefferson 5984
McVeigh, John A. .....1823 Ridge Ave.
Poplar 0369 Park 1434
Mervine Bros .....616 N. 5th St.
Market 2791 Main 7577
Roberts, Henry L. .....288 N. 16th St.
Rittenhouse 7831 Race 4258
Spear, Jas. Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629
Weiss, Frederick J. ....2307 N. 7th St.
Diamond 6881
Welamb, V. N. Co. ....2315 Walnut St.
Rittenhouse 6475 Race 3593

HEATERS—STEAM HEATERS

Boiler Equipment Co. 1226 Shelmire Ave.
Fox Chase 0671
Bowers Bros. & Co. ....2015 Sansom St.
Rittenhouse 9322 Race 5439
Dougherty, Frank P.
Passyunk & Juniper Sts.
Oregon 0436
Dussinger, M. F. .....625 E. Hilton St.
Garfield 3846
Eisemann, Conrad D. ..5233 Oxford Ave.
Delaware 1640 East 8180
Forrest, Richard ..Mascher & Norris Sts.
Regent 1870
Gormely, P., Co. .....155 N. 10th St.
Walnut 0561 Race 2793
Hallinan, James F. .....5218 Vine St.
Sherwood 9300 West 1915
Kauffman, R. .....4308 N. Broad St.
Michigan 4290 North 0108
Lukens, Thompson H. ....321 S. 13th St.
Pennypacker 5983 Race 4711
McVeigh, John A. .....1823 Ridge Ave.
Poplar 0369 Park 1434
Mervine Bros. .....616 N. 5th St.
Market 2791 Main 7577
Modern Home Rebuilders Penna.
3314 Lancaster Ave.
Evergreen 7900
Roberts, Henry L. .....228 N. 16th St.
Rittenhouse 7831 Race 4258

HEATERS—UNIT HEATERS

Johnson, Fan & Blower Co. ..The Bourse
Lombard 9300

HEATERS—VACUUM HEATERS

Roberts, Henry L. .....228 N. 16th St.
Rittenhouse 7831 Race 42.8

HEATERS—VAPOR HEATERS

Broomell Vapor Heating Co.
215 So. 17th St.
Pennypacker 6574
Becker, Howard A. ..2222 Frankford Ave.
Regent 6061
Bowers Bros. & Co. ....2015 Sansom St.
Rittenhouse 9322 Race 5439
Dussinger, M. F. .....625 E. Hilton St.
Garfield 3846
Eisemann, Conrad D. ..5233 Oxford Ave.
Delaware 1640 East 8180
Hallinan, James F. .....5218 Vine St.
Sherwood 9300 West 1915
McVeigh, John A. .....1823 Ridge Ave.
Poplar 0369 Park 1434

HEATERS—VAPOR HEATERS—Continued

Roberts, Henry L. .....228 N. 16th St.
Rittenhouse 7831 Race 4258
Spear, Jas. Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629

HEATERS—WARM AIR HEATERS

Boyle, Jas. E. 3331 Frankford Ave.
Garfield 3544-M
Hershey, John C. .....128 N. 21st St.
Rittenhouse 0209
John, Benj. F., Co. .....1003 Race St.
Walnut 5680 Race 5572
Waterman-Waterbury Co. ..1003 Race St.
Walnut 5680

HEATERS—WATER HEATERS—COAL FIRED

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486

HEATERS—WATER HEATERS—GAS FIRED

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Humphrey Automatic Water Heater
Spear, James, Stove & Heating Co.
1823 Market St.
Rittenhouse 7044
Lovekin Water Heater Co... 39 Laurel St.
Market 6410
Ruud Water Heater
Bartlett & Co., Inc. .....1938 Market St.
Rittenhouse 6797 Race 2710
Mears-Kane-Oefeldt, Inc.
1903 E. Hagert St.
Regent 7267 East 7439

HEATERS—WATER HEATERS—INSTANTANEOUS WATER HEATERS

Humphrey Water Heater
Spear, James, Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629
Pittsburgh Water Heater
Fleck Bros. & Co. .....50 N. 5th St.
Lombard 9140 Main 8801
Ruud Water Heater
Bartlett & Co., Inc. .....1938 Market St.
Rittenhouse 6797 Race 2710

HEATING APPARATUS

Elliot, Edwin & Co. .....560 N. 16th St.
Poplar 0747

HEATING APPARATUS—GAS HEATING APPARATUS

Mears-Kane-Oefeldt, Inc.
1903 E. Hagert St.
Regent 6267 East 7439

HEATING CONTRACTORS

(See Contractors—Heating Contractors)

HEATING ENGINEERS

(See Engineers—Heating Engineers)

HEATING SUPPLIES

Clearfield Plumbing Supply Co..
15th & Clearfield Sts.
Tioga 3752
Fleck Bros. Co. .....50 N. 5th St.
Lombard 9140 Main 8801
(See advertisement page 74)

HEAT REGULATORS—REGULATORS—HEAT REGULATORS HEAVY HAULING

McGurk, James H., Inc.
N. E. Cor. 2d & Columbia Ave.
Regent 3288

HOISTS—ASH HOISTS

Ernst, Charles K., Co. .....Otis Bldg.
Rittenhouse 8070
Gillis & Geohegan ..2019 Rittenhouse St.
Rittenhouse 4564 Race 7144
Washburn & Granger .....28 N. 5th St.
Lombard 8866

HOISTS—CHAIN HOISTS

Box Crane & Hoist Corp.
Ontario N. Trenton Ave.
Jefferson 3571
Chisholm, Moore Mfg. Co. ..Bourse Bldg.
Lombard 9300
Coates & Rainear, Inc. ..244 N. 22d St.
Rittenhouse 6930 Race 7444
Ford Chain Block Co. 2d & Diamond Sts.
Regent 7460
Wright Mfg. Co. .....1428 Callowhill St.
Rittenhouse 6400

HOISTS—CONTRACTORS' HOISTS

Coates & Rainear, Inc ....244 N. 22d St.
Rittenhouse 6930 Race 7444
Flory, S., Mfg. Co. .20th & Venango Sts.
Tioga 6290 Paark 5551
Giles & Ransome .....231 N. 12th St.
Walnut 5666
Kelley, E. B., Co., Inc. .....520 Arch St.
Lombard 6837 Main 1867
Mundy Hoisting Engine Co.
1744 Market St.
Rittenhouse 1744 Race 1744
Standard Scale & Supply Corp.
510 Arch St.
Lombard 9107 Main 3598

HOISTS—DUMP BODY HOISTS

Hydraulic Hoist Mfg. Co. St. Paul, Min.
9th & Jefferson Sts.
Stevenson 4180
Rodenhausen Sales & Service Co.
9th & Jefferson Sts.
Stevenson 4180

HOISTS—ELECTRIC HOISTS

American Engineering Co.
Aramingo & Cumberland Sts.
Regent 7140 East 7991
Chisholm Moore Mfg. Co. ..The Bourse
Lombard 9300
Harnischfeger Sales Corp.
5102 Lancaster Ave.
Belmont 9795 West 3950
Lewis-Shepard Co. .....709 Arch St.
Lombard 1893
Mundy Hoisting Engine Co.
1744 Market St.
Rittenhouse 1744 Race 1744
Shepard Electric Crane & Hoist Co.
City Centre Bldg.
Locust 7913 Race 9588
Vanderbeck, S. R. .....20 S. 15th St.
Rittenhouse 8062
Ward, Lee T. Co. .....619 Filbert St
Lombard 9009 Main 7789

HOISTS—GASOLINE HOISTS

Beckwith Machinery Co.
Front & Brown Sts.
Market 2735 Park 4084
Mundy Hoisting Engine Co.
1744 Market St.
Rittenhouse 1744 Race 1744
Service Equipment Co.....211 N. 3d St.
Market 3084 Main 5966

HOISTS—GASOLINE HOISTS—Continued

Staley & Morris, Inc. .....214 N. 22d St.
Rittenhouse 5160 Race 1988
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

HOISTS—HYDRAULIC HOISTS

Wood Hydraulic Hoist & Body Co.
3428-½ N. 18th St.
Tioga 5418

HOLLAND FURNACES PHILADELPHIA

Holland Furnace Co. ...830 N. Broad St.
Poplar 5035
Holland Furnace Co. ....1713 S. 20th St.
Jackson 2830
Holland Furnace Co. ....5549 Gtn. Ave.
Germantown 5629
Holland Furnace Co. ....3506 Rhawn St.
Holmesburg 2390

CAMDEN, N. J.

Holland Furnace Co. .1268 Haddon Ave.
Camden 5853

CHESTER, PA.

Holland Furnace Co. .....29 W. 4th St.
Chester 1839

NORRISTOWN, PA.

Holland Furnace Co. ...405 W. Main St.
Norristown 1891

HOLLOW METAL DOORS

(See Doors—Hollow Metal Doors)

HOLLOW TILE

(See Tile—Hollow Tile)

HOSE—AIR HOSE

Diamond Rubber Co.
23d St. & Allegheny Ave.
Tioga 8617 Park 3913
Mulconroy Co., Inc...54th & Jefferson Sts.
Belmont 7700 West 1744

HOSE—FIRE HOSE

stle, Jas. M., Inc. .....1718 Vine St.
Rittenhouse 5996
amond Rubber Co.
23d St. & Allegheny Ave.
Tioga 8617 Park 3913
reka Fire Hose Mfg. Co.
Municipal Dept., Denckla Bldg.
Walnut 0396 Race 1844
hwartz Bros. .....104 N. 8th St.
Lombard 8120 Main 5165
irt & Knox Mfg. Co. .23d & York Sts.
Columbia 6520 Park 5533

HOSE—GARDEN HOSE

amond Rubber Co.
23d St. & Allegheny Ave.
Tioga 8617 Park 3913

HOSE—METAL HOSE

odall Semi-Metallic Hose & Mfg. Co.
Emerald & Haggert Sts.
Regent 3851
ilconroy Co., Inc...54th & Jefferson Sts.
Belmont 7700 West 1744

HOSE—RUBBER HOSE

mond Rubber Co.
23d St. & Allegheny Ave.
Tioga 8617 Park 3913
odall Semi-Metallic Hose & Mfg. Co.
Emerald & Haggert Sts.
Regent 3851
nhattan Rubber Mfg. Co.
2132 Market St.
Rittenhouse 7268 Race 5684

HOSE—STEAM HOSE

mond Rubber Co.
23d St. & Allegheny Ave.
Tioga 8617 Park 3913
lconroy Co., Inc...54th & Jefferson Sts.
Belmont 7700 West 1744.

HOT AIR HEATERS

(See Heaters—Hot Air Heaters)

HOT WATER HEATERS

See Heaters—Hot Water Heaters)

HOUSE MOVING

ir's, Christian, Sons ..227 N. E. Blvd.
Michigan 0541
Jeil, James D. .....Elkins Park
Ogontz 859

HOUSE WRECKING

(See Wrecking—House Wrecking)

HUMIDIFYING APPARATUS

Carrier Engineering Corp.
Land Title Bldg.
Rittenhouse 5586 Race 7836

HUMPHREY WATER HEATERS

Spear, James, Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629

INCINERATORS

Freeman & Cruthers ..2401 Chestnut St.
Rittenhouse 9840
Kerner Incinerator Co. ..231 N. 12th St.
Walnut 5666
San-A-Tor Co. .....1533 Chestnut St.
Rittenhouse 8438
Steel & Wike Co. .....533 N. 13th St.
Poplar 6621
(See advertisement page 118)
Washburn & Granger .....28 N. 5th St.
Lombard 8866

INSULATION—ASBESTOS INSULATION

American Insulation Co.
Bonsall St. N. of Race St.
Rittenhouse 8783
Central Asbestos Co. .....828 N. 4th St.
Market 3078 Park 1465

INSULATION—CORK INSULATION

Aetna Asbestos Insulation & Roofing Co.
1234 Callowhill St.
Spruce 5830
Cork Import Corp.....1524 Chestnut St.
Rittenhouse 5917
Ehret Magnesia Mfg. Co.
1315 W. Cumberland St.
Columbia 4537 Park 2207
Livezey, John R.
Glenwood Ave. W. 22d St.
Diamond 4003 Park 2074
Mundet, L. & Son, Inc. ....329 N. 2d St.
Market 3418

INSULATION—HIGH TEMPERATURE INSULATION

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408

INSULATION—HOUSE INSULATION

Cabot, Samuel, Inc. ..Real Est. Tr. Bldg.
Pennypacker 3517 Race 5501
Livezey, John R. ..Glenwood W. 22d St.
Diamond 4003 Park 2074

INSULATION—MAGNESIA INSULATION

Carey, Philip, Co. ..24th & Sedgley Ave.
Tioga 8576 Park 5408
Ehret Magnesia Mfg. Co.
1315 W. Cumberland St.
Columbia 4537 Park 2207
Phila. Asbestos Co. .....2010 N. 10th St.
Columbia 5434 Park 4065

INSULATION—UNDERGROUND INSULATION

Rig-Wil Co. .....254 S. 15th St.
Pennypacker 4871

INSURANCE—CASUALTY INSURANCE

Columbia Casualty Co. ..416 Walnut St.
Lombard 0156 Main 9347
Commonwealth Casualty Co.
210 S. 5th St.
Lombard 9530 Main 8861
General Accident Fire & Life Assurance Corp., Ltd. .....4th & Walnut Sts.
Lombard 2234 Main 9160
Hartford Accident & Indemnity Co.
307 Walnut St.
Lombard 1921 Main 3388
Indemnity Insurance Co. North America .....232 Walnut St.
Lombard 5840 Main 9277
Independence Indemnity Co.
5th &. Walnut Sts.
Lombard 8400 Main 5127
London Guarantee & Accident Co.
512 Walnut St.
Lombard 8590 Main 7894
London & Lancashire Indemnity Co.
129 S. 4th St.
Lombard 8661 Main 8384
New Amsterdam Casualty Co.
138 S. 4th St.
Lombard 7952 Main 7367
Paine, H. G., Co. .....1601 Chestnut St.
Rittenhouse 8073 Race 1575
Patton, Edw. W., Co. .....Lincoln Bldg.
Rittenhouse 4834 Race 5756
Phoenix Indemnity Co. ....219 S. 5th St.
Lombard 5419

INSURANCE—CASUALTY INSURANCE—Continued

Royal Indemnity Co. ....300 Walnut St.
Lombard 5270 Main 5653
Silliman, Kunkel Co. .....112 S. 4th St.
Lombard 1658 Main 9384
Smith, Thos. B., Co. .....Packard Bldg.
Rittenhouse 0590 Race 5946
Stokes, Packard, Haughton & Smith
5th & Walnut Sts.
Lombard 4190 Main 8384
U. S. Fidelity & Guaranty Co.
127 S. 5th St.
Lombard 5596 Main 3351
Union Indemnity Co. .....Cunard Bldg.
Pennypacker 4161 Race 7593

INSURANCE—FIRE INSURANCE

Alliance Ins. Co. Phila. ..420 Walnut St.
Lombard 1604 Main 1654
Atlantic Mutual Fire Ins. Co. Phila.
Widener Bldg.
Rittenhouse 0987 Race 1634
Commercial Union Assurance Co., Ltd.
416 Walnut St.
Lombard 0157 Main 9347
Franklin Fire Ins. Co. Phila.
421 Walnut St.
Lombard 4590 Main 2011
Franklin National Ins. Co. 424 Walnut St.
Lombard 1151
Girard Fire & Marine Ins. Co.
502 Walnut St.
Lombard 5995 Main 9003
Home Ins. Co. N. Y. .....224 S. 4th St.
Lombard 4122 Main 2469
Independence Fire Ins. Co.
5th & Walnut Sts.
Lombard 8400
Independent Ins. Agency ..Crozer Bldg.
Rittenhouse 4529
Insurance Co. North America
1600 Arch St.
Rittenhouse 9900 Race 1211
National Security Fire Ins. Co.
1600 Arch St.
Rittenhouse 9900 Main 2591
Paine, H. G. Co. .....1601 Chestnut St.
Rittenhouse 8073 Race 1575
Patton, Edw. W., Co. .....Lincoln Bldg.
Rittenhouse 4834 Race 5756
Penna. Lumbermen's Mutual Fire Ins. Co.
Lafayette Bldg.
Lombard 6790 Main 7337
Peoples National Fire Ins. Co. Phila.
427 Walnut St.
Lombard 0454 Main 7864

INSURANCE—FIRE INSURANCE—Continued

Queen Insurance Co. of America
416 Walnut St.
Lombard 0157 Main 9347

Royal Insurance Co., Ltd. 306 Walnut St.
Lombard 4211 Main 1661

Smith, Thos. B., Co. .....Packard Bldg.
Rittenhouse 0590 Race 5946

Stokes, Packard, Haughton & Smith
5th & Walnut Sts.
Lombard 4190 Main 8384

Thomson, Harry E., Inc.
2521 Frankford Ave.
Regent 0600 East 7226

INSURANCE—LIABILITY INSURANCE

Curtin & Brockie .....406 Walnut St.
Lombard 2085 Main 7746

Keystone Indemnity Exchange
110 S. 16th St.
Rittenhouse 5140 Race 7934

Mather & Co. .....226 Walnut St.
Lombard 0120 Main 4841

Walsh's, Daniel J., Sons, Inc.
504 Walnut St.
Lombard 0455 Main 1129

INSURANCE—PLATE GLASS INSURANCE

Mather & Co. .....226 Walnut St.
Lombard 0120 Main 4841

Metropolitan Casualty Ins. Co.
220 S. 4th St.
Lombard 5886 Main 7507

N. Y. Casualty Co. .....305 Walnut St.
Lombard 5517 Main 5717

U. S. Plate Glass Ins. Co. ..Bullitt Bldg.
Lombard 0834 Main 1923

INSURANCE—WORKMEN'S COMPENSATION INSURANCE

Employers Mutual Ins. N. Y.
Crozer Bldg.
Rittenhouse 4529

General Accident Fire & Life Assurance Corp., Ltd. .....4th & Walnut Sts.
Lombard 2234 Main 9160

Mather & Co. 226 Walnut St.
Lombard 0120 Main 4841

Smith, Thomas B., Co. ..Packard Bldg.
Rittenhouse 0590 Race 5946

Walsh's, Daniel J., Sons, Inc.
504 Walnut St.
Lombard 0455 Main 1129

INTERIOR DECORATORS

(See Decorators—Interior Decorators—Painting and Paperhanging)

INTERIOR WOODWORK

(See Millwork)

INTERLOCKS—ELEVATOR INTERLOCKS

(See Elevator Interlocks)

INTERNATIONAL MOTOR TRUCKS

International Harvester Co. of America
2905 N. 16th St.
Tioga 4791 Park 2789

IRON—BAR IRON

Atlas Iron & Steel Co. ..1536 N. Del. Ave.
Regent 0890 East 8959
(See advertisement page 36)

Fritch, R. B. & Co. ..3d & Venango Sts.
Regent 1006 Park 4910

Morris Wheeler & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601

Nicetown Plate Washer Co.
1824 W. Juniata St.
Michigan 1736 North 0687

IRON BUILDINGS

(See Buildings—Portable—Iron and Steel)

IRON CASTINGS

(See Castings—Iron Castings and Grand Iron Castings)

IRON—CELLAR DOORS—IRON

(See Doors—Cellar Doors—Iron Cellar Doors)

IRON—ERECTING IRON

DeCou, Richard, Co.
11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)

Van Duser, A. B. ..1247 N. Warnock St.
Stevenson 7560

IRON FENCE

(See Fence & Gates—Iron)

IRON FOUNDERS

Creswell, Samuel J., Iron Works
23d & Cherry Sts.
Rittenhouse 6877 Race 2538
(See advertisement page 36)

IRON GATES

(See Fence & Gates—Iron)

IRON GRILLES

(See Grilles—Iron Grilles)

IRON—ORNAMENTAL IRON

Belmont Iron Works
22d & Washington Ave.
Oregon 0510 Race 6471
Liberi, Domenick & Sons 1137 S. Broad St.
Oregon 8062 Race 2618
(See advertisement page 300)
Biggin, Charles P., Co. ..1829 Harlan St.
Poplar 1877 Park 4711
Corona Fire Escape Co. ....269 S. 4th St.
Lombard 3115

IRON PLATES

Atlas Iron & Steel Co. 1536 N. Del. Ave.
Regent 0890 East 8959
(See advertisement page 36)
Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Morris Wheeler & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601

IRON RAILINGS

(See Railings—Iron Railings)

IRON—SHEET IRON

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
Central Alloy Steel Corp. .Widener Bldg.
Rittenhouse 2791 Race 6541
Fable & Co., Inc. .....510 N. 3d St.
Market 3002 Main 9067
Horrocks Iron Works ..1435 N. 31st St.
Stevenson 4141 Park 1041
Kennedy, Walter C. ....102 W. Berks St.
Regent 7821
Morris Wheeler & Co., Inc.
30th & Locust St.
Evergreen 5900 West 1601
Riter Bros. & Co., Inc. ..1022 Race St.
Walnut 2226 Race 4309

IRON—STRUCTURAL IRON

Architectural Steel Engineering Co., Ltd.
1518 N. 13th St.
Stevenson 7058 Park 4124
Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)
DeCou, Richard, Co.
11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)
Liberi, Domenick & Sons
1137 S. Broad St.
Oregon 8062 Race 2618
(See advertisement page 300)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Brownworth & Co. .....1611 Sansom St.
Rittenhouse 6156 Race 4305
Corchin, Max .....609 Reed St.
Oregon 5767 Main 5004
Hitner's, Henry & Sons Co.
Gaul & Huntingdon Sts.
Regent 3070 East 9025
Horrocks Iron Works ..1435 N. 31st St.
Stevenson 4141 Park 1041
Morris Wheeler & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601
Whartenby, Harry A.
1823 Brandywine St.
Poplar 8660 Race 9886
Biggin, Charles P., Co. ..1829 Harlan St.
Poplar 1877 Park 4711

IRON WORK—ORNAMENTAL IRON WORK

Creswell, Samuel J., Iron works
23d & Cherry Sts.
Rittenhouse 6877 Race 2538
(See advertisement page 36)
Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Clopp, George B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)
Acme Iron Works ....2619 W. York St.
Columbia 7918 Park 1416
Hitner's, Henry & Sons Co.
Gaul & Huntingdon Sts.
Regent 3070 East 7781

IRON WORK—ORNAMENTAL IRON WORK—Continued

Pettit, Frank, Ornamental Iron Works
1505 N. Mascher St.
Regent 9857 Park 4148

Finnegan & Janson ..918 Buttonwood St.
Poplar 4273 Race 3920

Humphreys & Co.
Frankford & Torresdale Aves.
Jefferson 1125 East 7124

Noe, Wm. L., Co. ....2d & Oxford Sts
Regent 4730 Park 4877

Quaker City Art Metal Works
2445 N. 2d St.
Regent 2545 Park 3395

Alterman & Canin ....2325 Smedley St.
Columbia 7755 Park 4307

Amer. Wire & Ornamental Iron Works
404 Addison St.
Lombard 3318

Clarkson, W. K. .....3535 N. 5th St.
Regent 3919

Columbia Iron Works ..1121 N. 3d St.
Market 1049 Park 3638

Commercial Iron Works
2021 E. Orthodox St.
Delaware 1131

Gensel, Fred & Co. .....911 Vine St.
Walnut 0859 Race 3790

Germantown Ornamental Iron Works
1134 Germantown Ave.
Market 5125

Haberle, Eugene ..56th & Summer Sts.
Sherwood 3812

Ward, Jos. T., Co. ....5809 Baynton St.
Germantown 3555

Hoffman, Chris, Inc. .....346 S. 4th St.
Lombard 2563 Main 2687

Industrial Iron Construction Co.
4840 Folsom St.
Belmont 7361

McArdle, Wm. H. & Son
511 Bainbridge St.
Lombard 4168

Parvin & Co. .....Stephen Girard Bldg.
Rittenhouse 2841 Race 3441

Pencoyd Iron Works .....Pencoyd, Pa.
Main 0166 North 0193

Reed, F. W., Co. ..Stock Exchange Bldg.
Rittenhouse 1664

Robinson Iron & Steel Co.
Parker & Umbria Sts.
Manayunk 0693

Sutton, W. A., Co. .....829 N. 19th St.
Poplar 1726

Vulcan Brazing & Mach. Co.
2126 Race St.
Rittenhouse 1649 Race 7193

IRON WORK—ORNAMENTAL IRON WORK—Continued

Whartenby, Harry A.
1823 Brandywine St.
Poplar 8660 Race 9886

IRON WORK—BUILDERS' IRON WORK

DeCou, Richard, Co.
11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)

Clopp, Geo. B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)

IRON WORK— IRON PLATE WORK

Clopp, George B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)

Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021

IRON WORK—MISCELLANEOUS IRON WORK

Creswell, Samuel J., Iron Works
23d & Cherry Sts.
Rittenhouse 6877 Race 2538
(See advertisement page 36)

Humphreys & Co.
Frankford & Torresdale Aves.
Jefferson 1125 East 7124

Kastrup, Charles .....144 Wolf St.
Jackson 1279

JACKS—LIFTING JACKS

DeHuff & Hopkins .....Morris Bldg.
Rittenhouse 0453 Race 9659

Master-Toll Co. Pa. 1735 Fairmount Ave.
Poplar 3345

Templeton, Kenly & Co., Ltd.
Drexel Bldg.
Lombard 1533

JANITORS' SUPPLIES

Atlas Products Co. .....253 N. 2d St.
Market 2439

Brittingham N. & Sons ..1315 Ridge Ave.
Poplar 2794 Race 3452

Cooperman, H. & Sons ....321 N. 2d St.
Market 1051 Main 6277

JANITORS' SUPPLIES—Continued

Hainsworth Supply Co. ..2411 N. 6th St.
Diamond 0222
Hoffman, F. W. & Co., Inc. 35 S. 4th St.
Lombard 9360 Main 7278
Hoffman, H. Sherwood & Co.
1035 Master St.
Stevenson 3112
Pyramid Supply Co. ..1728 W. Cayuga St.
Wyoming 4603 North 0449
Reiner, John F. & Co.
American & York Sts.
Regent 0281
Snyder, John, C. F. & Sons
2306 N. 28th St.
Columbia 8097 Park 3622
Tritsch, J. & Co. .....10 N. 3d St.
Market 2126 Main 4207

JOISTS—STEEL JOISTS

American Steel Engineering Co.
Fuller Bldg.
Rittenhouse 8832 Race 5714
Massillon Steel Joist Co.
1700 Walnut St.
Pennypacker 4747
Phila. Culvert Co.
16th St. & Washington Ave.
Oregon 1443 Race 7495
Steel Service Co. .....Fox Bldg.
Rittenhouse 3112

KALAMEIN DOORS

(See Doors—Kalamein Doors)

KETTLES—ROOFERS' KETTLES

Architectural Steel Engineering Co., Ltd.
1518 N. 13th St.
Stevenson 7058 Park 4124

KETTLES—TAR KETTLES

Littleford Bros. .....214 N. 22d St.
Rittenhouse 5160

KELVINATOR ELECTRIC REFRIGERATION

Kelvinator, Phila., Inc. 36 S. 17th St.
Rittenhouse 1901 Race 1707

KITCHEN CABINETS

(See Cabinets—Kitchen Cabinets)

KITCHEN EQUIPMENT

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

KITCHEN, BATH & BEDROOM EQUIPMENT

Smith, Alan G. .....844 N. Broad St.
Poplar 3039 Park 4406

KLEEN-HEET OIL BURNERS

Kleen-Heet Oil Burner Co.
811 N. Broad St.
Poplar 6117

KREOLITE WOOD BLOCKS

Jennison-Wright Co. .....Crozer Bldg.
Rittenhouse 8496

KUEHNLE PAINTS

Kuehnle, Inc. .....Vine & 17th Sts.
Rittenhouse 5474 Race 7749

LADDERS
(General Purpose Ladders)

Burhanna & Wilson .....2540 Gtn. Ave.
Diamond 4680 Park 5287
Crain Pump & Lumber Co. 17 N. 7th St.
Lombard 9525 Main 9184
Horst Bros. .....139 N. 6th St.
Market 3048 Main 8986
Krewson, T. C. .....803 Master St.
Regent 9130
Moulton Ladder Co. .....154 N. 3d St.
Market 4911
Patent Scaffolding Co. ..2835 Bridge St.
Jefferson 4501 East 8912

LADDERS—IRON LADDERS

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

LADDERS—ROLLING STORE LADDERS

Hendrickson, T. B., & Co.
525 Commerce St.
Lombard 8246 Main 4271
Richards-Wilcox Mfg. Co. ..507 Arch St.
Lombard 8824 Main 4859
Rust, Harry R., Inc. ....724 Ludlow St.
Lombard 6877 Main 3297

LAMP POSTS—IRON LAMP POSTS

(See Posts—Iron Lamp Posts)

LANDSCAPE ARCHITECTS

(See Architects—Landscape Architects)

LANDSCAPE ARCHITECTS

Cridland, Robert B. ..308 S. Smedley St.
Pennypacker 7959

LANDSCAPE CONTRACTORS

(See Contractors—Landscape Contractors)

LANDSCAPE GARDENERS

American Forrestry Service
Lancaster Pike ab. City Line
Merion 1789
Century Landscape & Tree Service
52 S. 60th St.
Sherwood 1705
Hengel Bros. .....2095 N. 63d St.
Overbrook 4678 West 2305
Meehan, J. Franklin, & Sons
25 W. Horter St.
Germantown 0298
Spaulding, Louis L.
4721 Tackawanna St.
Jefferson 5676

LATH—WOOD LATH

Hoopes, Rufus C., Estate
Lansdowne, Pa.
Lansdowne 43-M

LATH—METAL LATH

(See Metal Lath)

LAWN TENNIS CONSTRUCTION

Ward, Jos. T., Co. .....5809 Baynton St.
Germantown 3555

LEADED GLASS

(See Glass—Leaded Glass)

LEATHER BELTING

(See Belting—Leather Belting)

LIGHTING FIXTURES

(See Fixtures—Gas & Electric)

LIGHTNING RODS

Pim, C. E. .....1615 Tioga St.
Tioga 8714
Syphard, Samuel H. .....310 N. 41st St.
Evergreen 2639

LIME

(See Building Material—Lime & Cement)

LIMESTONE

Bowditch, Walter ....49 E. Chelten Ave.
Germantown 2269
Lavino, E. J., & Co. .....Bullitt Bldg.
Lombard 5600
Warner, Chas., Co. ...Franklin Tr. Bldg.
Rittenhouse 0842 Race 3379

LINABESTOS FIREPROOF WALL-BOARD

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

LINOLEUM

(See Flooring—Linoleum Flooring)

LOCKERS—STEEL LOCKERS

All Steel Equip. Co. .....134 N. 4th St.
Market 0713 Main 6790
Darby Steel Equip. Co. ..1922 Gtn. Ave.
Columbia 4464
Durabilt Steel Locker Co.
1525 Cherry St.
Spruce 5906
Durand Steel Locker Co. ..Cunard Bldg.
Pennypacker 1432
Hart & Hutchinson Co.
Real Estate Trust Bldg.
Pennypacker 0944
Lyon Metallic Mfg. Co.
City Centre Bldg.
Spruce 8173
Medart Mfg. Co. .....Ledger Bldg.
Lombard 0248
Darby, Edward, & Son ...338 Brown St.
Market 5465 Park 5004

LUMBER—ASBESTOS LUMBER

(See Asbestos Lumber)

LUMBER—BUILDING LUMBER

Gillingham Co., The
Morris & Richmond Sts.
Regent 8450
(See advertisement page 30)

Riley, J. T., Inc. .....616 Pine St.
Lombard 5796 Main 7724
(See advertisement page 22)

Gibson-Walker Co. ....Luzerne & F Sts.
Garfield 3140 Park 4164
(See advertisement page 112)

Alcott, W. K., & Co.
52d St. & Lancaster Ave.
Belmont 0514 West 1892

Allen, Ellwood, Lumber Co.
Trenton Ave. & Ann St.
Regent 1150 East 7761

Beatty & Wise, Inc.
Delaware Ave. & South St.
Lombard 6746

Central's Lumber Yard
12th & Spring Garden Sts.
Poplar 8766

Clothier & Sharpe Bros.
25th & Mifflin Sts.
Oregon 3632 Race 7575

Cope & Bevan ...4010 Germantown Ave.
Wyoming 8653 North 0151

Derr Lumber Co. .....6326 Market St.
Allegheny 2715 West 1741

Felin, Chas. F., & Co., Inc.
York Rd. & Butler St.
Michigan 3150 North 0601

Gotschall & Morgan Co.
7th & Main Sts., Darby, Pa.
Darby 132-W Darby 141

Haney-White Co.
17th St. & Glenwood Ave.
Columbia 1200 Park 2853

Jones, Samuel, & Sons
3207 Spring Garden St.
Evergreen 7165 West 1809

Ketcham, Howard ..330 W. Girard Ave.
Market 3448 Park 1137

McIlvain, J. Gibson, & Co.
58th St. & Woodland Ave.
Woodland 2987 West 1661

Pearson & Ludascher Lumber Co.
E. Westmoreland St. & Delaware Ave.
Regent 3000 East 7841

Ross, J. Anderson, Co..2917 N. Broad St.
Columbia 2232 Park 3951

Shaw, James, & Son
52d St. & Woodland Ave.
Woodland 9640 West 1177

LUMBER—BUILDING LUMBER—Continued

Smedley Bros. Co.
Church & Tacony Sts.
Jefferson 7120 East 7745

Strathmann, Henry E., Inc.
49 E. Chelten Ave.
Germantown 2269 Park 3067
Same .....Ontario St. Wharf
Regent 6091

Watson, Malone, & Sons
Laurel St. Wharf
Market 3805 East 7981

Anderson-Ross Co. ...2917 N. Broad St.
Columbia 2232

Daniel Buck Estate .....1505 N. 5th St.
Columbia 6566 Park 4971

Buzby, S. M., & Sons ....626 Wash. Ave.
Oregon 8720 Main 7589

Clothier Lumber Co.
Rhawn & Leiper Sts.
Jefferson 6732 East 8962

Dodds, Arnold K.
7044 State Road, Tacony
Tacony 1256 East 8366

Frost, W. M., & Co.
Walsh Rd. N. Montague St.
Holmesburg 1126

Gurevitch, Chas., & Sons
2421 Washington Ave.
Oregon 6561

Hoffman Sash & Door Co.
1623 Vine St.
Spruce 3915

Hoopes, Rufus C., Estate
Lansdowne, Pa.
Lansdowne 43-M

Irvin, James M., & Co. ...976 N. 8th St.
Market 2108

Janney Lumber Co. ..1131 N. Dela. Ave.
Regent 0989

Kearney Lumber Co.
2569 Grays Ferry Ave.
Jackson 0604 Race 4374

Walsh, Chas. V.
58th St. & Woodland Ave.
Woodland 5252 West 1148

LUMBER—FIR LUMBER

Pearson & Ludascher Lumber Co.
Westmoreland St. & Delaware Ave.
Regent 3000 East 7841

LUMBER—HARDWOOD LUMBER

Buck, Daniel, Estate .....1505 N. 5th St.
Columbia 5466 Park 4971

LUMBER—HARDWOOD LUMBER —Continued

Nass, George, & Son
Glenwood Ave. & Dauphin St.
Columbia 8022
Sheip, Henry H., Mfg. Co.
6th St. & Columbia Ave.
Diamond 8311 Park 4646
White, Chas. H., & Sons
18th St. & Indiana Ave.
Columbia 7316 Park 1125

LUMBER—STEEL LUMBER

(See Steel Lumber)

LUMBER—WHITE PINE LUMBER

Yykes, Jos. H. .....19th & Cambria Sts.
Columbia 8920 Park 4193

LUMBER—YELLOW PINE LUMBER

Pearson & Ludascher Lumber Co.
Westmoreland St. & Delaware Ave.
Regent 3000 East 7841

LUPTON PRODUCTS

Lupton's Sons Co., David
Allegheny Ave. & Tulip St.
Regent 9700 East 7951
Lupton Steel Counters
" " Sashs
" " Shelving
" " Factory Equipment
" " Partitions
" Sash Operators

MACK MOTOR TRUCKS

Mack International Motor Truck Corp.
42d St. & Woodland Ave.
Woodland 9112 West 2871

MAGNESIA BOILER COVERING

(See Boiler Covering—Magnesia)

MAIL CHUTES

(See Chutes—Mail Chutes)

MANTELS

Quice, Frank A. ..21st St. & Ridge Ave.
Stevenson 3168 Park 2148
Stendorf, Wm. G. ...3126 N. Broad St.
Tioga 4327
Williamson & Messinger
2715 N. Broad St.
Columbia 1705

MARBLE—NATURAL MARBLE

Holmesburg Concrete Co.
Welsh Rd. & Crispen St.
Holmesburg 1014
Philadelphia Marble & Slate Co.
1944 N. 20th St.
Stevenson 8512
American Marble, Inc. .201 N. Broad St.
Locust 2093 Race 1442
Bowes, Robert E., Granite Co.
3635 York Rd.
Wyoming 4404
Carminati, G. ....1923 E. Passyunk Ave.
Oregon 1051 Race 3439
Cosenza, Albert ..Juniper & Federal Sts.
Oregon 2079
Costow, W., & Co. .....1909 S. 6th St.
Oregon 7411

MARBLE—ARTIFICIAL MARBLE

Bloom, Louis, Studios ...3739 Filbert St.
Evergreen 7106
Cousins, H. A. .....3739 Filbert St.
Evergreen 7106
Sani Const. Co., Inc. .....467 N. 8th St.
Market 6526
Venzie, F. M., & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317

MARBLE—INTERIOR MARBLE

Costow, W., & Co. .....1909 S. 6th St.
Oregon 7411
Crosby Marble Co. .....Schaff Bldg.
Rittenhouse 3792
Hegarty, John, Marble Co. .1422 Deal St.
Jefferson 2110
Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
Manning, Seymour .....748 N. 40th St.
Baring 7901
Peacock, George R. .....1111 Vine St.
Walnut 4483 Race 1478
Vermont Marble Co.
22d & Westmoreland Sts.
Tioga 3157 Park 4697
Wilson, M. G. .....2313 Walnut St.
Rittenhouse 7564

MARBLE CLEANING

McCann Bros. .....2316 South St.
Locust 8061

MARBLE CLEANING—Continued

McCann, John, & Son ..1808 Ludlow St.
Rittenhouse 6897
Watson, Wm. H. .....649 N. 17th St.
Poplar 0534

MARQUEES—METAL MARQUEES

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316

MASONRY CONTRACTORS

(See Contractors—Masonry Contractors)

MASTIC FLOORING

(See Floors—Mastic Floors)

MEDART STEEL PRODUCTS

Medart, Fred, Mfg. Co.
Public Ledger Bldg.
Lombard 0248 Main 5012
Medart Steel Lockers
" " Storage Cabinets
" " Wardrobes

MEDICINE CABINETS

(See Cabinets—Medicine Cabinets)

METAL CASES—SPECIAL DESIGN METAL CASES

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

METAL CEILINGS

(See Ceilings—Metal Ceilings)

METAL COLUMNS

(See Columns—Metal Columns)

METAL CORNER BEADS

(See Corner Beads—Metal Corner Beads)

METAL CORNICES

(See Cornices—Metal Cornices)

METAL LATH

Consolidated Expanded Metal Cos.
1083 Germantown Av
Market 1468 Park 4188
Lorenz, John G., Corp.
1011 Chestnut S
Walnut 4319 Race 5154
Pearce Fireproof Co. .....1911 N. 2d S
Regent 9840 Park 1115
Penn Metal Co. ....25th & Wharton St
Jackson 6300 Race 6916
Van Sciver Corp. ..24th St. bel. Parkwa
Rittenhouse 6610 Race 2421
Berger Mfg. Co.
16th St. & Washington Av
Oregon 1443

METAL LATH CONTRACTORS

(See Contractors—Metal Lath Contractors)

METAL LOCKERS

(See Lockers—Steel Lockers)

METAL ROOFING

(See Roofing—See Roofing—Sheet Metal Roofing)

METAL SASH

(See Sash—Steel Sash)

WEATHER STRIPPING

(See Weather Stripping—Metal Weather Stripping)

METAL WINDOWS

(See Sash—Steel Sash and Windows—Steel Casement Windows)

METERS—BOILER FEED WATER METERS

Simplex Valve & Meter Co.
68th & Upland Sts
Woodland 9214

METERS—GAS METERS

riffin, John J. & Co. .....1513 Race St.
Rittenhouse 7876
elme & McIlhenny
17th & Clearfield Sts.
Tioga 4434

METERS—STEAM FLOW METERS

uyette, Paul B., Co., Inc. ..5 S. 18th St.
Rittenhouse 6007 Race 3520

METERS—WATER METERS

hila. Meter Co. ....Real Est. Tr. Bldg.
Pennypacker 0822 Race 3459

MILLWORK

merican Woodworking Co.
6509 Magnolia Ave.
Germantown 9445
illingham Co., The
Norris & Richmond Sts.
Regent 8450 East 7975
(See advertisement page 30)
iley, J. T., Inc. .....616 Pine St.
Lombard 5796 Main 7724
(See advertisement page 22)
ramer Woodworking Co.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
(See advertisement page 22)
entral's ....12th & Spring Garden Sts.
Poplar 8766
entury Millwork Co.
452 N. Orianna St.
Market 3406
lothier & Sharpe Bros.
25th & Mifflin Sts.
Oregon 3632
rain Pump & Lumber Co. ..623 Arch St.
Market 3210
ruice, Frank A. ..21st St. & Ridge Ave.
Stevenson 3168 Park 2148
unningham & Wurzer
2555 Carpenter St.
Jackson 3351
ngland, Frank A., Co.
1124 Washington Ave.
Oregon 1398 Race 2463
arrell, Hamilton J.
63d St. & Woodland Ave.
Woodland 4575 West 1909
elin, Charles F. & Co., Inc.
York Rd. & Butler St.
Michigan 3150 North 0601

MILLWORK—Continued

Fowler & Weigold
Angora Ave. & 59th St.
Allegheny 2877 West 2422
Haney-White Co.
17th St. & Glenwood Ave.
Columbia 1200 Park 2853
Ideal Woodworking Co., Inc.
485 N. 4th St.
Market 6477 Main 7126
Penna. Door & Sash Co.
Atlantic & F Sts.
Regent 2325 East 7966
Rippmann, Louis .....450 N. 12th St.
Poplar 8843
Ross, J. Anderson, Co. 2917 N. Broad St.
Columbia 2232 Park 3951
Shaw, James & Son Co.
52d St. & Woodland Ave.
Woodland 9640 West 1177
Westmoreland Mfg. Co.
1111 W. Westmoreland St.
Tioga 4615
Wilt, A. & Sons Co. ....723 N. Front St.
Market 4521 Park 2328
Epstein, Harry Co. .....912 S. Front St.
Lombard 7987
A. B. C. Porch Enclosure Co.
439 West Berks St.
Regent 9469 Park 1181
Arrigale, Lawrence & Son
14 W. Thompson St.
Regent 4371
Best-Bilt Co. .....7127 Grays Ave.
Woodland 4004
Century Woodwork & Contg. Co.
3506 G St.
Regent 1951
Cope & Bevan ....4010 Germantown Ave.
Wyoming 8653 North 0151
Dodds, Arnold K.
7044 State Rd., Tacony
Tacony 1256 East 8366
Durell, E., Clifford .....1713 N. 24th St.
Stevenson 6247
General Woodworking Co.
1216 N. Mascher St.
Regent 6620 Park 2176
Gurevitch, Charles & Sons
2421 Washington Ave.
Oregon 6561
Hall Bros. & Wood
54th St. & Lancaster Ave.
Belmont 3765
Hoffman Sash & Door Co.
1623 Vine St.
Spruce 3915

MILLWORK—Continued

Huskey Mfg. Co.
Columbia Ave. & Howard St.
Regent 1500 Park 1144
Lawrence Woodworking Co.
1618 Sellers St.
Jefferson 0432
Marquardt, R. J. .....417 Spruce St.
Lombard 4379
Middle City Woodworking Co.
2009 Sansom St.
Locust 1343 Race 2021
Penn Cabinet Co. ....213 S. Jessup St.
Pennypacker 6408
Phila. Suburban Mill Cabinet & Stair Co.
6218 Paschall Ave.
Woodland 0206
Raff, A. Raymond, Co.
1635 W. Thompson St.
Stevenson 2841 Park 4726
Robinson, John & Co. ..49 Queen Lane
Germantown 7957 North 0464

MINERAL WOOL

Krewson Asbestos Co. ..542 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)

MINNEAPOLIS HEAT REGULATOR

Minneapolis Heat Regulator Co.
Bulletin Bldg.
Spruce 9228

MINERAL FLOORING

(See Flooring—Mineral Flooring)

MIRRORS

Smith, Alan G, Mfg. Agent
844 N. Broad St.
Poplar 3039 Park 4406

MORTAR COLORS

Cabot, Samuel, Inc. ..Real Est. Tr. Bldg.
Pennypacker 3517 Race 5501

MOSAIC

(See Tile—Mosaic Tile)

MOTORS—ELECTRIC MOTORS

(See Electric Machinery—Motors—Electric)

MOTOR TRUCKS

Garford Motor Truck Co.
2308 Chestnut St.
Rittenhouse 1922 Race 7809
Thornton-Fuller Automobile Co.
Graham Bros. Trucks
24th & South Sts.
Spruce 6735
International Harvester Co.
2905 N. 16th St.
Tioga 4791
Mack International Motor Truck Corp.
42d St. & Woodland Ave.
Woodland 9112 West 2871

MOULDED PRODUCTS

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

MOULDINGS—METAL MOULDINGS

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigas 7400 North 0165
(See advertisement page 248)
Kawneer Co.
Central Tr. Bldg., 4th & Market Sts.
Market 2847 Main 5818

MOULDINGS—WOOD MOULDINGS

McGowan, D. H.
S. E. Cor. 8th & Cherry Sts.
Lombard 8088 Main 8932
Penna. Door & Sash Co.
Atlantic & F Sts.
Regent 2325
Reliable Moulding Co. ..121 Cuthbert St.
Market 6365
Sheppard, Joseph R. .....916 Filbert St.
Walnut 0359
Dodds, Arnold K. .....7044 State Rd.
Tacony 1256
Friedman, Joseph .....1426 S. 5th St.
Oregon 4447

MULTIGRAPHING & MIMEOGRAPHING

Hurff, Ella S. ....1622 Rl. Est. Tr. Bldg.
Pennypacker 3683

MURPHY IN-A-DOOR BEDS

Murphy Door Bed Co..512 Bulletin Bldg.
Spruce 6680 Race 5043

NAILS

Hand, Edw. L., & Co. .....521 Arch St.
Lombard 9007 Main 1920
Liberty Supply Co., Inc.
W. School La. & Reading R. R.
Manayunk 1160
Middleton Nail Wks. ..911 Callowhill St.
Walnut 3186 Race 4275
Wainwright, A. B., Co.
Commercial Trust Bldg.
Rittenhouse 2343 Race 6516

NATCO HOLLOW TILE

National Fireproofing Co.
Land Title Bldg.
Rittenhouse 4761 Race 2778

NO-KOL AUTOMATIC OIL BURNER

Buckley & Scott, Inc. ..717 N. Broad St.
Poplar 8100 Park 2192
Buckley & Scott, Inc. ..5125 Walnut St.
Allegheny 1263 West 1069
Mawby Pensyl., Inc.
49 E. 8th St., Chester, Pa.
Chester 4085
Modern Utilities, Inc. ..Jenkintown, Pa.
Ogontz 2696
Parker, H. L.
511 Federal St., Camden, N. J.
Camden 5211
Vetterlein Co., Inc.
323 W. Lancaster Ave.
Ardmore 3315

OFFICE EQUIPMENT—STEEL OFFICE EQUIPMENT

Columbia Steel Equipment Co.
1735 Chestnut St.
Rittenhouse 2962 Race 1643
Riter Bros. & Co., Inc. ....1022 Race St.
Walnut 2226 Race 4309
Van Sciver, J. B., Co.
Market St. Ferry, Camden, N. J.
Lombard 6200

OFFICE EQUIPMENT—WOOD OFFICE EQUIPMENT

Graff, Anton .....1737 N. Howard St.
Regent 9555
Van Sciver, J. B., Co.
Market St. Ferry, Camden, N. J.
Lombard 6200

OFFICE PARTITIONS

(See Partitions—Office Partitions)

OIL BURNERS—COMMERCIAL AND INDUSTRIAL OIL BURNERS

Silent Automatic Corp.
1624 Chestnut St.
Rittenhouse 2523
(See advertisement page 6)
Caloroil Oil Burner
Duncan, Norton E. ...4818 Balto. Ave.
Woodland 0809
Kleen-Heet Oil Burner
Kleen-Heet Oil Burner Agency
811 N. Broad St.
Poplar 6177
Nokol Auto Oil Burner
Buckley & Scott, Inc. .717 N. Broad St.
Poplar 8100 Park 2192
Timken-Detroit Oil Burner
Timken-Detroit Co. ..831 N. Broad St.
Park 4800
Oil-O-Matic Oil Burner
W. P. MacKenzie ..1234 Callowhill St.
Spruce 5830
Ballard Oil Equipment Co.
3318 Lancaster Ave.
Evergreen 1134 West 2907
Gulf Oil Burner Co.....1627 Chestnut St.
Rittenhouse 8555 Race 4061

OIL BURNERS—DOMESTIC OIL BURNERS

Silent Automatic Oil Burner
Silent Automatic Corp.
1624 Chestnut St.
Rittenhouse 2523
(See advertisement page 6)
Gulf Oil Burner Co. ...1627 Chestnut St.
Rittenhouse 8555
Hardinge Automatic Oil Burner Co.
1327 W. Girard Ave.
Stevenson 5033
Linton & Kolb .....719 N. Broad St.
Poplar 7586
Sword Burners, Inc. ..4535 N. Broad St.
Michigan 3183

OIL DISPENSING APPARATUS

Bowser, S. F., & Co., Inc.
Insurance Co. N. America Bldg.
Rittenhouse 6920 Race 3507
Eastern Oil Equip. Co...Land Title Bldg.
Rittenhouse 7426
Perfection Oil Dispenser Co.
518 N. Broad St.
Poplar 2718

OIL-O-MATIC OIL BURNER

MacKenzie, W. P., Co. 1234 Callowhill St.
Spruce 5830

ORNAMENTAL IRON WORK
(See Iron Work—Ornamental Iron Work)

PACKING—LEATHER PACKING

Houghton, E. F., & Co.
240 W. Somerset St.
Regent 7100
Mechanical Leather Spec. Co.
622 New Market St.
Market 0911

PACKING—METALLIC PACKING

Crane Packing Co. .....108 Walnut St.
Lombard 6740
France Packing Co., Inc. .6512 State Rd.
Tacony 1024
U. S. Metallic Packing Co., The
429 N. 13th St.
Poplar 1397
Walker Metallic Packing Co.
4617 Tacony St.
Jefferson 7778 East 8769

PACKING—RUBBER PACKING

Belmont Packing & Rubber Co.
12th & Arch Sts.
Spruce 3474 Race 1990

PAINTING—COLD WATER PAINTING

Muratone Co. .....1428 N. Sydenham St.
Stevenson 9708
Salkind, David .....634 Pine St.
Lombard 3345 Main 2101
Zementine Co., Inc. .....1242 N. 31st St.
Poplar 8180 Race 4231

PAINTING—HOUSE PAINTING

Black, F. A. & Son .....711 Locust St.
Lombard 5772 Main 1362
Bonnin's Son, L. W.
2049 Rittenhouse Square
Locust 2445
Burhans & Bonsall .....255 S. 52d St.
Allegheny 5700

PAINTING—HOUSE PAINTING—Continued

Cornell & Co. .....6227 Sansom St.
Sherwood 0825
Fellman, Wm. ....5500 Wyalusing Ave.
Granite 9639
Foster, Edgar H. & Son
1920 Fitzwater St.
Locust 2123
Gaurd, A. 1821 Harrison St.
Jefferson 1912
Kleiman, Abraham ..6th St. & Erie Ave.
Tioga 2329 Park 3823
Kuehnle, Inc. .....17th & Vine Sts.
Rittenhouse 5474 Race 7749
Lamlein, Louis & Sons ..2447 N. Pk. Ave.
Columbia 3342
Locke, John .....632 S. 52d St.
Sherwood 4200
Mackenzie Co. .....267 S. 20th St.
Pennypacker 7241
Master House Painting Co.
2040 Cherry St.
Rittenhouse 3257
McMahon, E. Co. ..Arch St. bel. 63d St.
Sherwood 3101
McPherson, C. D. .....2338 Gtn. Ave.
Columbia 4874
Mitchell, Robert .....301 S. Alden St.
Granite 6316
Myers, Walter N. .....1210 N. 13th St.
Stevenson 5178
Palladino Paint Co.
10th & Ellsworth Sts.
Jackson 1846
Peterson, John .....125 N. 18th St.
Rittenhouse 7672
Rau, Henry S., Co. .....1937 Market St.
Rittenhouse 6296 Race 6757
Winterman, Harry ..624 W. Luzerne St.
Michigan 8442
Murphy, J. J. & Co. ....1835 Ludlow St.
Rittenhouse 7958 Race 5605
Aucker Decorating Co. ..1308 Wallace St.
Poplar 2331
Bartolett, Milton ..6707 Torresdale Ave.
Mayfair 1324
Beardsley, A. & Son ....1217 N. 11th St.
Stevenson 1124
Benner, John H. .....2026 Sansom St.
Rittenhouse 3877 Race 1453
Black, John .....6022 Walnut St.
Sherwood 5052
Breedings, B. P., Sons ..719 Chelten Ave.
Waverly 1020
Burr, Wm. H. & Son ..3922 Market St.
Evergreen 2600
Butler, J. H. & Son ..4853 Chestnut St.
Sherwood 2451

PAINTING—HOUSE PAINTING—Continued

Calhoun, J. F. & Son ....2646 N. 9th St.
Columbia 0772
Callan, Thos. H. .....4443 N. 7th St.
Michigan 8875
Carrick, R. J. .....331 N. 20th St.
Pennypacker 4851 Race 7666
DeHaven, George ....3152 N. Taylor St.
Tioga 5312
Drayton, Geo. H. ....6315 Limekiln Pike
Waverly 3291
Gage, W. F. .....7008 Saybrook Ave.
Woodland 8747
Schairer, Edmund .....2927 N. 22d St.
Columbia 6131 Park 3381

PAINTING—INDUSTRIAL PAINTING

Adams, Frank L., Co.
6662 Lincoln Drive
Germantown 4324
Armstrong, Thos. J. & Co.
1628 W. Thompson St.
Stevenson 5345 Park 4342
Industrial Painting Engineers
31 S. 52d St.
Sherwood 8620
Johnson, A. W. .....9 S. Ruby St.
Allegheny 5565
Kuehnle, Inc. .....17th & Vine Sts.
Rittenhouse 5474 Race 7749
Rau, Henry S., Co., Inc. ....1937 Mkt. St.
Rittenhouse 6296 Race 6757
Salkind, David .....634 Pine St.
Lombard 3345 Main 2101
Calhoun, J. F. & Son ....2646 N. 9th St.
Columbia 0772

PAINTING—FLAG POLE PAINTING

Orth, G. P. ..523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 34)

PAINTING—SPRAY PAINTING

Philadelphia Spray Painting Co.
4414 Chestnut St.
Evergreen 9332
Industrial Painting Engineers
31 S. 52d St.
Sherwood 8620
Johnson, A. W. .....9th & Ruby Sts.
Allegheny 5565
Kuehnle, Inc. .....17th & Vine Sts.
Rittenhouse 5474 Race 7749

PAINTING—SPRAY PAINTING—Continued

Muratone Co. ....1428 N. Sydenham St.
Stevenson 9708
Rau, Henry S., Co., Inc. ..1937 Market St.
Rittenhouse 6296 Race 6757
Salkind, David .....634 Pine St.
Lombard 3345 Main 2101
Squires, C. W., Jr. ..Broad & Sansom Sts.
Pennypacker 5974 Race 4300
Van Duser, A. B. ..1247 N. Warnock St.
Stevenson 7560
Zementine Co., Inc. .....1242 N. 31st St.
Poplar 8180 Race 4231

PAINTING—STRUCTURAL STEEL PAINTING

Orth, G. P. ..523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 302)

PAINTING—WALL PAINTING

Allegheny Decorating Co.
201 E. Wishart St.
Garfield 3987
Rau, Henry S., Co., Inc. ..1937 Mkt. St.
Rittenhouse 6296 Race 6757

PAINTS & VARNISH—DEALERS IN PAINTS & VARNISH

Allegheny Paint & Glass Co.
1847 E. Allegheny Ave.
Regent 9338
Bennett, G. S. & Co. .....114 N. 9th St.
Walnut 1615 Race 5519
Bonds Hardware Store
Broad St. & Lindley Ave.
Michigan 5238
Burns Paint Shop .....40 N. 60th St.
Sherwood 3238
Buten, M. & Sons Co. .....33 N. 7th St.
Lombard 7312
Same .....1834 South St.
Pennypacker 8466
Central Light & Paint Co.
227 S. 10th St.
Walnut 1523 Main 3841
Chappell, J. B., Inc. .....4325 Main St.
Manayunk 0199
Diskan Paint Co. ..1240 W. Girard Ave.
Stevenson 3536
Finnaran & Haley, Inc.
60th & Thompson St.
Allegheny 7946 West 1822
Same .....5716 Chester Ave.
Woodland 1805

PAINTS & VARNISH—DEALERS IN PAINTS & VARNISH—Continued

Fowler Co. .....605 N. 8th St.
Market 0172
Gillingham, Chas. A. ....1514 S. 22d St.
Oregon 8069 Race 8208
Same .....250 S. 6th St.
Sherwood 0720 West 1861
Same .....12th & Morris Sts.
Oregon 0308 Race 6105
Haley & Wenzel .....5659 N. 5th St.
Waverly 7741
Hennings, Wm. J. .....5834 Gtn. Ave.
Germantown 0281
Johnson, S. C. & Son ..410 Commerce St.
Lombard 8498 Main 2214
Leighton-Hurt Paint Co.
1654 Ridge Ave.
Poplar 8196
Perry's Paint Store .....6129 Ridge Ave.
Roxborough 3207
Phila. Paint & Glass Co. ..1015 Arch St.
Walnut 4577 Race 3601
Phoenix Paint & Varnish Co.
124 Market St.
Lombard 0560 Main 3395
Quality Paint Store .....422 S. 60th St.
Allegheny 0318
Rau, Henry S, Co., Inc. ..1937 Mkt. St.
Rittenhouse 6296 Race 6757
Trainer, Walter L., Co ....3328 Gtn. Ave.
Tioga 2347 Park 2249
Woods & Gillum .7159 Germantown Ave.
Chestnut Hill 0763

PAINTS & VARNISH—MANUFACTURERS PAINTS AND VARNISH

American Asphalt Paint Co.
617 Arch St.
Market 3990 Main 7701
Atlantic Drier & Varnish Co.
Meadow & Wolf Sts.
Oregon 7676
Barreled Sunlight Agency ..Bailey Bldg.
Pennypacker 1450 Race 6518
Calbar Paint & Varnish Co.
2622 N. Martha St.
Regent 7175 East 7561
Cheesman, Elliot Co., Inc.
5531 Pulaski Ave.
Germantown 4976
Concrete Waterproof Paint Co.
836 N. 3d St.
Market 4525 Park 3959

PAINTS & VARNISH—MANUFACTURERS PAINTS & VARNISH—Continued

DeVoe, & Raymolds Co., Inc.
933 N. Front St.
Market 2670 Park 2130
Graves, N. Z., Inc. .....400 Chestnut St.
Lombard 1475 Main 5810
Keystone Albumen & Paint Co.
1346 N. Marston St.
Poplar 2300 Park 1870
Kuehnle, Inc. .....17th & Vine Sts.
Rittenhouse 5474 Race 7749
Lowe Bros. Co. .....236 N. 3d St.
Market 6109
Lucas, John & Co., Inc......322 Race St.
Market 0448 Main 4936
Mineral-Lac Paint Co., Inc. 67 Laurel St.
Market 3093 Park 3870
Monroe Lederer & Taussig
606 N. American St.
Market 4043 Main 3371
Moore, Benjamin & Co.
6337 Magnolia Ave.
Germantown 9092
Nice Co., Eugene .....268 S. 2d St.
Lombard 1877 Main 5852
(See advertisement page 28)
Price, Wm. H., Co. .....211 S. 10th St.
Walnut 0649
Pyramid Paint Co. .....131 N. 22d St.
Spruce 3827 Race 3462
Quaker Paint Co. ....G & Venango Sts.
Garfield 0966
Rice's Mill White Agency ..Bailey Bldg.
Pennypacker 1450 Race 6518
Rising Sun Color Works
544 Rising Sun Ave.
Michigan 4560
Sherwin-Williams Co.
Delaware Ave. & Chestnut St.
Lombard 4584 Main 9211
Sipe, Jas. B. & Co. .....Estey Bldg.
Rittenhouse 5959 Race 1454
Spruance, Gilbert, Co.
Richmond & Tioga Sts.
Regent 6172 East 7294
Steelcote Mfg. Co...436 Spring Garden St.
Market 1039
Turpsene Mfg. Co., Inc. ..315 Mkt. St.
Market 3951 Main 8022
Wetherill, Geo. D. & Co., Inc.
113 Arch St.
Market 0506
Wetherill & Bro. .....126 S. 30th St.
Evergreen 2501 West 1138
Yarnall Paint Co. ..Grays Ave. & 54th St.
Woodland 0150 West 1771

PAINTS—ROOF PAINTS AND COATINGS

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

PAINTS—WATERPROOFING PAINTS

Aquabar Waterproofing Products
Perry Bldg.
Rittenhouse 7012

PANEL BOARDS
(See Electrical Equipment)

PAPER—ASBESTOS PAPER

Carey, Philip Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)
Crewson Asbestos Co. ..542 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)

PAPER—BLUE PRINT PAPER

Atlas Blue Print Co. .....34 S. 16th St.
Rittenhouse 8894 East 8959
Barclay Bros. .....1515 Sansom St.
Rittenhouse 9816
Defiance Sales Corp. .....1214 Arch St.
Spruce 8842
Keystone Blue Paper Co. ..910 Filbert St.
Walnut 4614 Race 7119
Kenninger & Graves ....1311 Sansom St.
Pennypacker 3204 Race 1973
Same .....1237 Filbert St.
Locust 5269 Race 7679

PAPER—BUILDING PAPER

Riegel & Co. .....6th & Cherry Sts.
Market 2470 Main 2438
Stanley, J. W. Co. ..3312 Lancaster Ave.
Evergreen 2176 West 1490
Warren-Ehret Co. ....Erie Ave. & E St.
Regent 2480 Park 2333

PAPER—WALL PAPER
(See Wall Paper)

PAPERHANGERS SUPPLIES

Sam Bros. .....919 Arch St.
Walnut 5460 Race 7824

PAPERHANGING
(See Wall Paperhanging)

PARQUETRY FLOORING
(See Flooring—Parquetry Flooring)

PARTITIONS—BANK PARTITIONS

Kramer Woodworking Co., Inc.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
(See advertisement page 22)
Rust, Harry R., Inc. ....724 Ludlow St.
Lombard 6877 Main 3297
Sjostrom, John E., Co., Inc.
1715 N. 10th St.
Stevenson 4710 Park 2046
Stremme & Schweder .....4270 Paul St.
Delaware 4137 East 8953

PARTITIONS—GLASS & STEEL PARTITIONS

Clancy, James A. .....Harrison Bldg.
Spruce 7791

PARTITIONS—OFFICE PARTITIONS

Improved Office Partition Co.
719 Delancey St.
Lombard 8650
(See advertisement page 248)
Kramer Woodworking Co.
20th St. & Indiana Ave.
Columbia 6417 Park 2237
(See advertisement page 22)
American Woodworking Co.
Germantown 8445
Bernheim & Sons, Inc. ...1401 N. 3d St.
Regent 0536
Huskey Mfg. Co.
Columbia Ave. & Howard St.
Regent 1500 Park 1144
Interior Milling Co. ....2531 Poplar St.
Poplar 4294
Peterson, Carl A. .....1932 N. 2d St.
Garfield 2203
Rieder, Frank & Sons ....415 Brown St.
Market 3360
Rust, Harry R., Inc. .....724 Ludlow St.
Lombard 6877 Main 3297
Sjostrom, John E., Inc. ..1715 N. 10th St.
Stevenson 4710 Park 2046
Stremme & Schweder .....4270 Paul St.
Delaware 4137 East 8953
National Woodworking Co.
909 Walnut St.
Pennypacker 5627 Main 5958

PARTITIONS—OFFICE PARTITIONS—ADJUSTABLE OFFICE PARTITIONS

Improved Office Partition Co.
719 Delancey St.
Lombard 8650
(See advertisement page 248)

PARTITIONS—PLASTER BLOCK PARTITIONS

Venzie, F. M., & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317

PARTITIONS—"SANYMETAL" PARTITIONS

Clancy, James A.—Sales Agent
Harrison Bldg.
Spruce 7791

PARTITIONS—SHOWER BATH PARTITIONS

Clancy, James A. .....Harrison Bldg.
Spruce 7791

PARTITIONS—STEEL PARTITIONS

Allison Steel Products Co.
Harrison Bldg.
Rittenhouse 4580 Race 6136
Sanymetal Products Co. .Harrison Bldg.
Spruce 7791
Thorn, J. S., Co.
20th St. & Allegheny Ave.
Tioga 8532
Lupton Steel Partitions
Lupton's, David, Sons Co.
Allegheny Ave. & Tulip St.
Regent 9700 East 7951

PARTITIONS—STEEL—BILT-TO-ORDER

Ohmstrand, A. E. .....Bulletin Bldg.
Rittenhouse 8127 Race 2276
(See advertisement page 296)

PARTITIONS—TOILET PARTITIONS—METAL TOILET PARTITIONS

METAL TOILET PARTITIONS

Gassner, Thos. S., Co....4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

METAL TOILET PARTITIONS—Continued

Phila. Fire Retardant Co. . 1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)
Clancy, James A. .....Harrison Bldg.
Spruce 7791
Whartenby, Harry A.
1823 Brandywine St.
Poplar 8660

PARTITIONS—WIRE PARTITIONS

Aubel, F. & E. ...2503 Germantown Ave.
Columbia 8158 Park 2316

PARTITIONS—WOOD PARTITIONS

Kramer Woodworking Co.
20th St. & Indiana Ave.
Columbia 6417 East 8988
(See advertisement page 22)

PASSENGER ELEVATORS

(See Elevators—Passenger Elevators)

PAVEMENTS—GLASS PAVEMENTS

American Bar Lock Co. .2500 Duncan St.
Delaware 4995

PAVING—ASPHALT PAVING

Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 244)
Krause, Wm. .....1621 N. 5th St.
Columbia 0857

PAVING—CONCRETE PAVING

Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 244)
Gramm, Harris, Inc.
176 E. Tulpehocken St.
Germantown 6060 North 0132
Armstrong, Irvine .....1809 S. 22d St.
Oregon 6092
Brown, John .....2039 Carpenter St.
Oregon 1283J
Carter Paving Co.
50th St. & Lancaster Ave.
Belmont 6197 West 1451

PAVING—CONCRETE PAVING—Continued

Edwards, Frank .....3937 Reno St.
Evergreen 7794
Heebner, Geo. K. .....1231 Vine St.
Spruce 5013 Race 7108
Hymowitz & Sons .....317 S. 6th St.
Lombard 6398 Main 2248
Logan, Andrew J. ..5431 Wyalusing Ave.
Allegheny 4466
Mann, M. J. .....4206 Chestnut St.
Evergreen 4210
McCoy Cement Paving Co.
340 N. 57th St.
Sherwood 3617
Mullen, Edw. A., Inc. .....5512 Vine St.
Sherwood 7971 West 1953
Ockman & Haberman ..2703 Gordon St.
Diamond 7725 Park 2590
Reuter, P. N. .....1043 W. Venango St.
Tioga 8693W
Ruoff Construction Co. ...3747 N. 2d St.
Regent 7325
Smith, Joseph R., Co. ..3102 Euclid Ave.
Diamond 4634
Brennan, Frank .....25th & Tasker Sts.
Oregon 8701 Race 1278
Budd, W. B. .....5421 Chester Ave.
Woodland 3229
Clark Paving Co....5100 Warrington Ave.
Woodland 0246
Flood, John L., Jr. .....1649 Bridge St.
Jefferson 1816
Franz Paving Co...2d St. & Fishers Ave.
Michigan 0464 Park 2266

PAVING—GRANITE BLOCK PAVING

Drehmann Paving & Construction Co.
508 Glenwood Ave.
Regent 6728 Park 4784
(See advertisement page 244)

PAVING—WOOD BLOCK PAVING

Hennison-Wright Co. .....Crozer Bldg.
Rittenhouse 8469
Republic Creosoting Co.
City Centre Bldg.
Locust 0513

PHOTOGRAPHERS—COMMERCIAL PHOTOGRAPHERS

Muldin, Charles P. .....2939 Fkd. Ave.
Regent 6325

PHOTOGRAPHERS—COMMERCIAL PHOTOGRAPHERS—Continued

Horn, S. C. & Co. .....1107 S. 54th St.
Allegheny 1340
Klein & Goodman .....114 S. 11th St.
Pennypacker 2775
Menzen Studios .....1020 Arch St.
Walnut 1668
Meyers & Barcey .....1526 Vine St.
Rittenhouse 6722 Race 4651
Photo Illustrators .....1210 Locust St.
Pennypacker 3205
Quaker Photo Service ..930 Chestnut St.
Pennypacker 1957 Main 2250
Robinson, Harry .....405 Market St.
Market 0808
Stott, H. R. .....1639 N. Edgewood St.
Belmont 6571
Bell, D. Sargeant .....115 S. 16th St.
Rittenhouse 8795
Berry & Homer .....604 Arch St.
Lombard 6776
Dillon, James L. & Co. ..907 Walnut St.
Pennypacker 1928 Main 1076
Jennings, W. N. .....45 S. 17th St.
Rittenhouse 7765 Race 1490

PHOTOSTAT PRINTS

Atlas Blue Print Co. .... ..34 S. 16th St.
Rittenhouse 8894 Race 7632
Barclay Bros. .....1515 Sansom St.
Rittenhouse 9011
Campion & Mayo, Inc. ..1904 Sansom St.
Rittenhouse 4240 Race 1922
Phila. Blue Print Co. .....38 S. 6th St.
Lombard 7046 Main 4263
Quaker City Blue Print Co.
1617 Sansom St.
Rittenhouse 8140 Race 7584
Renninger & Graves ..1311 Sansom St.
Pennypacker 3204 Race 1973
Same .....1237 Filbert St.
Locust 5269 Race 7679
Robbins, Chas. H., Co. ..1729 Sansom St.
Rittenhouse 7530
Williams, Brown & Earle
918 Chestnut St.
Pennypacker 7320 Main 7261

PILE DRIVING

Armstrong & Latta Co. ..1926 Sansom St.
Rittenhouse 1866
Brenneman, J. E., Co. ..N. Amer. Bldg.
Pennypacker 5636 Race 6512
Latta & Roberts .....Drexel Bldg.
Lombard 0351

PILE DRIVING—Continued

Simplex Foundation Co. ..... State Rd. & Van Kirk St.
Jefferson 3683
Terry, J. H. & Co. .....Drexel Bldg.
Lombard 0400 Main 7993

PILE DRIVING EQUIPMENT

Janney, Steinmetz & Co. 1421 Chestnut St.
Rittenhouse 2720
Shannon, J. Jacob & Co. ..1744 Mkt. St.
Rittenhouse 1744 Race 1744

PILING

Foundation & Construction Co. 1320 Race St.
Locust 0272
(See advertisement page 44)
Bowers, S. P., Co. .....Schaff Bldg.
Rittenhouse 5584
Talley's, Thos. J., Sons ....Schaff Bldg.
Spruce 0318 Race 2613

PIPE—BENDING PIPE

Standard Piping and Fitting Company 30th & Race Sts.
Evergreen 1092 West 1116

PIPE—BRASS PIPE

American Brass Co. .....Widener Bldg.
Rittenhouse 2571
Mory & Byckwalter, Inc. 25th & Morris Sts.
Oregon 8926 Race 3338

PIPE—CAST IRON PIPE

U. S. Cast Iron Pipe & Foundry Co. Morris Bldg.
Rittenhouse 4100

PIPE—CONCRETE PIPE

Concrete Products Co., American Packard Bldg.
Rittenhouse 3695 Race 4219

PIPE—COPPER PIPE

American Brass Co. ....Widener Bldg.
Rittenhouse 2571

PIPE—CULVERT PIPE

Hitner's, Henry A., Sons Co. 4501 Richmond St.
Jefferson 4800 East 7781
(See advertisement page 327)
Penn Metal Co. ....25th & Wharton Sts.
Jackson 6300 Race 6916
Phila. Culvert Co. 16th St. & Washington Ave.
Oregon 1443 Race 7495

PIPE—DRAIN PIPE—ACID RESISTANT

Knight, M. A. .....1228 Spruce St.
Pennypacker 6983

PIPE—IRON PIPE

Reading Iron Co. .....Drexel Bldg.
Lombard 0617 Main 1182
Walworth Co. .....245 Arch St.
Market 2055 Main 8741

PIPE—SEWER PIPE

Abbey Co. .....Commercial Trust Bldg.
Rittenhouse 3167
Clausen, Wm. H. ..27th & Diamond Sts.
Columbia 6526
Concrete Products Co., American Packard Bldg.
Rittenhouse 3695 Race 4219
Fitzgerald, J. J. & Co. ..2d & Butler Sts.
Regent 6848 Park 4385
Lukens, J. Parry .....Liberty Bldg.
Rittenhouse 3209
Nat'l Fire Proofing Co. Land Title Bldg.
Rittenhouse 4761 Race 2278
Progressive Clay Co. .....Bulletin Bldg.
Spruce 3176
Robinson, T. & Co. ..Real Est. Tr. Bldg.
Pennypacker 8161 Race 4545
Stokes, Edw. C. ....Transportation Bldg.
Rittenhouse 4840 Race 7085

PIPE—STEEL PIPE

Koons, E. W. & Co. .....911 Filbert St.
Walnut 1927 Race 1631
Maneely, John Co. .....247 N. 12th St.
Walnut 4082 Race 3331

PIPE—USED PIPE

Hitner's, Henry A., Sons Co. 4501 Richmond St.
Jefferson 4800 East 7781

PIPE—WROUGHT IRON PIPE

American Pipe & Supply Co. Vandalia & Porter Sts.
Oregon 0374 Main 9132
Belfield, H., Co. .....435 N. Broad St.
Poplar 2264 Race 7911
Byers Co., A. M. .....Morris Bldg.
Rittenhouse 0220 Race 3525
Maneely Co., John .....247 N. 12th St.
Walnut 4082 Race 3331
Reading Iron Co. .....Drexel Bldg.
Lombard 0617 Main 1182

PIPE COILS

Phila. Pipe-Bending Co. ..4165 N. 5th St.
Michigan 1280 Park 4176

PIPE COVERINGS—ASBESTOS PIPE COVERINGS

Aetna Asbestos Insulation & Roofing Co. 1234 Callowhill St.
Spruce 5830
(See advertisement page 64)
Central Asbestos Co. ....828 N. 4th St.
Market 3078 Park 1465
(See advertisement page 69)
Doud, M. P. .....Widener Bldg.
Rittenhouse 0963
(See advertisement page 69)
Krewson Asbestos Co. ..542 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)
Asbestos Boiler & Pipe Coverings Co. 1324 Columbia Ave.
Stevenson 7015
Carey, Philip, Co. ..24th & Sedgley Ave.
Tioga 8576 Park 5048

PIPE COVERINGS—CANVAS PIPE COVERINGS

Humphreys, R. A., Sons, Inc. 1021 Callowhill St.
Walnut 6020

PIPE COVERING—CORK PIPE COVERING

(See Insulation—Cork Insulation)

PIPE COVERING—MAGNESIA PIPE COVERING

(See Insulation—Magnesia Insulation)

PIPE COVERING—85% MAGNESIA PIPE COVERING

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

PIPE COVERING—UNDERGROUND PIPE COVERING

Carey, Philip, Co. ..24th & Sedgley Ave.
Columbia 6430 Park 5408
(See advertisement page 10)

PIPE FITTINGS

Fleck Bros. Co., Inc. .....50 N. 5th St.
Lombard 9140 Main 8801
(See advertisement page 74)
Crane Co. .....212 S. 13th St.
Pennypacker 1250 Race 4463
Devlin, Thos. Mfg. Co. 23d St. & Sedgley Ave.
Diamond 9067 Park 4787
Fretz, S., Jr. & Co. 23d St. & Sedgley Ave.
Diamond 9067
Mory & Buckwalter, Inc. 25th & Morris Sts.
Oregon 8926 Race 3338
Perkes, Charles, Co. .....627 Arch St.
Market 2780 Main 4914
Sees & Faber Co., Inc....2008 N. Front St.
Regent 0530 Park 2761
Service Supply Corp. 20th & Venango Sts.
Tioga 6290 Park 5551
Walworth Co. .....245 Arch St.
Market 2055 Main 8741

PIPE FITTINGS—ACID RESISTANT PIPE FITTINGS

Knight, M. A. .....1228 Spruce St.
Pennypacker 6983

PIPE HANGERS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Branch-Crawford Co. ....1539 Wood St.
Rittenhouse 6252 Race 1538

PIPING CONTRACTORS—POWER PIPING

Boon & Sample, Inc. ..3008 Ludlow St.
Evergreen 7885 West 1997
Reuss, Edw. H., Jr. ....30th & Race Sts.
Evergreen 2977

PLANING MILLS

(See Millwork)

PLASTER—COLOREX PLASTER

California Stucco Products Co.
1316 Olive St.
Poplar 3523 Park 3006
(See advertisement page 142)

PLASTER—ORNAMENTAL PLASTER

Pigeon, Ernest A.
3623 Berry Ave. Drexel Hill
Lansdowne 2637
Rocbond Co. .....780 S. 52d St.
Allegheny 6550
Venzie, F. M. & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317
Voigt Co. .....1743 N. 12th St.
Stevenson 0600 Park 4155

PLASTER—WALL PLASTER

California Stucco Products Co.
1316 Olive St.
Poplar 3523 Park 3006
(See advertisement page 142)
Ever Ready Plaster Co.
2019 W. Madison St.
Tioga 5669
Knickerbocker Lime Co.
24th St. bel. Parkway
Rittenhouse 8271 Race 2421
Smith, Edw. A. & Son .. 1015 Fkd. Ave.
Regent 2662 East 2749
U. S. Gypsum Co. .....Otis Bldg.
Rittenhouse 6161 Race 6681
Van Sciver Corp. ..24th St. bel. Parkway
Rittenhouse 6610 Race 2421

PLASTER BLOCKS

Venzie, F. M. & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317

PLASTER BOND

Hydroseal Waterproofing Co.
1536 N. Delaware Ave.
Market 4525 Park 3959
(See advertisement page 101)

PLASTER MIXERS

Staley & Morris, Inc. ....214 N. 22d St.
Rittenhouse 5160 Race 1988
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

PLASTER OF PARIS

Kalthoff, E. .....40 N. Water St.
Market 4400 Main 1890
Smith, Edw. A. & Son ..1015 Fkd. Ave.
Regent 2262 East 7749

PLASTERING

Alexander, M. .....538 N. 58th St.
Allegheny 5849
Amberg Bros. .....2613 W. York St.
Columbia 1164
Christopher, James G. ..26 E. Collom St.
Victor 1706
Cousins, H. A. .....3739 Filbert St.
Evergreen 7106
Egrich, Charles .....677 N. 15th St.
Poplar 5687
Gara, Frank E. .....1765 N. 29th St.
Stevenson 8529
Hymowitz & Sons .....317 S. 6th St.
Lombard 6398 Main 2248
Jacobs, Adolph G. ..Amer. & Bristol Sts.
Michigan 5970 Park 4951
Kensill, Wm. H. & Son.
518 E. Thompson St.
Regent 0400
Kligerman, B. ..406 W. Roosevelt Blvd.
Michigan 9272

PLASTERING

Leonard, Chas. E. .....635 W. York St.
Columbia 6773
McGonagle-Lederle Co. .2313 Walnut St.
Rittenhouse 5705
McLaughlin, Wm. H., & Son
59 E. Coulter St.
Victor 3813
Moore, M. J. .....919 N. Jessup St.
Stevenson 5531
Mulvaney, Walter ....3013 Wharton St.
Oregon 9799
Nesbitt, Geo. M. .....105 N. 55th St.
Allegheny 8183
Quinn, James A. ....3531 Lancaster Ave.
Evergreen 3468
Shaffer, Morris W. .....1721 N. 10th St.
Columbia 0974

PLASTERING—Continued

Venzie, F. M., & Co., Inc.
2610 W. Huntingdon St.
Columbia 8908 Park 5317
Ward, James M. ....2720 W. Gordon St.
Columbia 7955
Wood, E. J., & Co. .1010 Brandywine St.
Poplar 1689
Armstrong, William, & Sons
Phil-Ellena & Chew Sts.
Germantown 6150

PLASTERERS' SAFETY CLIPS

Raynor, John S. ....2300 E. Lehigh Ave.
Regent 0391

PLATE GLASS

(See Glass—Plate Glass)

PLATES—IRON PLATES

(See Iron Plates)

PLATE WORK—IRON PLATE WORK

(See Iron Work—Iron Plate Work)

PLATE WORK—STEEL PLATE WORK

(See Steel Plate Work)

PLUMBERS' BACK WATER VALVES

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

PLUMBERS' COMPRESSED AIR SERVICE

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

PLUMBING

(See Contractors—Plumbing Contractors)

PLUMBING SUPPLIES

Fleck Bros. Co. .....50 N. 5th St.
Lombard 9140 Main 8801
(See advertisement page 74)
Central Plumbing Supply Co.
12th & Spring Garden Sts.
Poplar 8766 Race 6791
Cleary, C. F., Co. ...2137 N. Howard St.
Regent 0613 Park 5051
Crane Co. .....212 S. 13th St.
Pennypacker 1250 Race 4463
Fisher Bros. .....710 S. Passyunk Ave.
Lombard 2161 Main 9062
Gitomer-Miller & Co. .....305 Arch St.
Market 0443 Main 2162
Johnson, J. D., Co., Inc. ...139 N. 7th St.
Market 5430 Main 4986
Hajoca Corp. .....120 S. 30th St.
Evergreen 5800 Park 2791
Keystone Supply & Mfg. Co.
927 N. 9th St.
Market 4133
Kohler Co. .....32d & Oxford Sts.
Poplar 5605
Lehman, M. A., & Co.
5833 Market St.
Sherwood 4176 West 2727
Mort Supply Co. ..4th St. & Girard Ave.
Market 4426 Park 4923
Service Supply Corp.
20th & Venango Sts.
Tioga 6290 Park 5551
Standard Sanitary Mfg. Co.
1215 Walnut St.
Pennypacker 2550 Race 7216
Walworth Co. .....245 Arch St.
Market 2055 Main 8741
American Tin & Terne Plate Co.
24th & Vine Sts.
Rittenhouse 7481 Race 1741
Douglas, John, Co. .....120 S. 30th St.
Evergreen 5800
Goldstein Bros. .....508 Arch St.
Lombard 9109
MacMullen & Co. ....1122 Callowhill St.
Walnut 2066
Sevill's Sons, Thos. ..1310 Wallace St.
Poplar 1146 Race 2576

POINTING—BRICK, STONE & TERRA COTTA POINTING

Christensen, Adolph ....1433 Brown St.
Poplar 0153
(See advertisement page 142)
Barr, Jos. R. .....1908 Parrish St.
Poplar 5523

POINTING—BRICK, STONE & TERRA COTTA POINTING—Continued

Franck, Howard E. ..2648 N. Sartain St.
Columbia 0587
Gallatig, Jacob .....2321 N. 6th St.
Columbia 8052
Heebner, Geo. K. .....1231 Vine St.
Spruce 5013
Hooven, Theo., & Co.
2545 N. Howard St.
Regent 6052
Mann, M. J. .....4206 Chestnut St.
Evergreen 4210
McCann, John, & Son ..1808 Ludlow St.
Rittenhouse 6897
Metzger, John ....2227 N. Lawrence St.
Regent 6094
Osmond, J. H. .....612 Race St.
Market 1979 Main 6138
Tighe, John C. .....1532 Kerbaugh St.
Wyoming 9175
Weatherproof Pointing Co.
1133 Callowhill St.
Walnut 0643
Acme Brick Pointing Co.
1129 W. Indiana Ave.
Columbia 6844
DeHaven, George ....3152 N. Taylor St.
Tioga 5312

POLES—FLAG POLES

(See Flag Poles—Wood & Steel Porch Enclosures)

A B C Porch Enclosure Co.
439 W. Berks St.
Regent 9649 Park 1181
Best-Bilt Co. .....7127 Grays Ave.
Woodland 4004
Cruice, Frank K. ..21st St. & Ridge Ave.
Stevenson 3168 Park 2148
Donosa & Krick .....2439 N. 9th St.
Columbia 5604
Durrell, E. Clifford ....1713 N. 24th St.
Stevenson 6247
Farrell, Ham J.
63d St. & Woodland Ave.
Woodland 4575 West 1909
Gerhardt-Voigts Co...Airdrie & Watt Sts.
Michigan 3140
Greenburg, L., & Son ....1409 Gtn. Ave.
Regent 6467
Horst Mfg. Co. .....5639 Vine St.
Sherwood 3842 West 2269
Huck-Gerhardt Co., Inc.
Luzerne & G Sts.
Regent 2886 Park 4151
Miller, C. Edgar, Jr. ..4751 N. Camac St.
Wyoming 1422

POLES—FLAG POLES—Continued

Porch Enclosures, Screens & Weatherstrip Co. .....West End Trust Bldg.
Rittenhouse 2383
Rippmann, Louis .....450 N. 12th St.
Poplar 8843
Westmoreland Mfg. Co.
1111 W. Westmoreland St.
Tioga 4615
Cardwell, S. H. .....636 E. Locust Ave.
Victory 6951
Century Woodwork & Contracting Co.
3506 G St.
Regent 1951

PORCHES—STORM PORCHES

Huck-Gerhardt Co., Inc.
G & Luzerne Sts.
Regent 2836 Park 4151

PORTABLE BUILDINGS

(See Buildings—Portable Iron & Steel)

POSTS—LAMP POSTS IRON

Smyser-Royer Co. .....1700 Walnut St.
Pennypacker 7195

PORTLAND CEMENT

(See Building Material—Lime and Cement)

POWER SHOVELS

(See Shovels—Power Shovels—Electric and Steam)

PRINTING

Buchanan, Geo. H., Co. ..420 Sansom St.
Lombard 0414 Main 7859

PULLEYS—IRON PULLEYS

Latimer, Robt. L. & Co. 24 N. Front St.
Market 0335 Main 5621

PULLEYS—MOTOR PULLEYS

Latimer, Robt. L. & Co. ..24 N. Front St.
Market 0335 Main 5621

PULLEYS—SASH PULLEYS

(See Hardware—Builders Hardware)

PULLEYS—STEEL PULLEYS

American Pulley Co.
4200 Wissahickon Ave.
Tioga 9140 Park 3981
Dodge Mfg. Corp. .....217 Race St.
Market 2833 Main 4196
Fifer & Beatty .....Front & Lehigh Ave.
Regent 1676 East 8467
Latimer, Robt. L. & Co. ..24 N. Front St.
Market 0335 Main 5621

PULLEYS—WOOD PULLEYS

Latimer, Robt. L. & Co. ..24 N. Front St.
Market 0335 Main 5621

PUMPING MACHINERY

Rumsey Pump Co., Ltd.
2401 Chestnut St.
Rittenhouse 9840

PUMPS—CELLAR PUMPS

Berger Bros. Co. .....229 Arch St.
Market 1551 Main 4066

PUMPS—CENTRIFUGAL PUMPS

Allis-Chalmers Mfg. Co. ..Atlantic Bldg.
Pennypacker 3511 Race 4369
American Well Works ....20 S. 15th St.
Rittenhouse 6052 Race 2684
Central Construction & Supply Co.
2222 Arch St.
Rittenhouse 5950 Race 5789
Crain Pump & Lumber Co. ..623 Arch St.
Market 3210 Main 9184
Penna. Pump & Compressor Co.
Penfield Bldg.
Pennypacker 6644 Race 1966
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

PUMPS—DEEP WELL PUMPS

Crain Pump & Lumber Co. ..623 Arch St.
Market 3210 Main 9184
Luitweiler Pumping Engine Co.
Harrison Bldg.
Locust 1998
Nicholas, Andrew J. & Co.
2208 N. 26th St.
Columbia 5801 Park 2128

PUMPS—FORCE PUMPS

Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

PUMPS—GASOLINE PUMPS

Bowser, S. F. & Co., Inc.
Insurance Co. N. America Bldg.
Rittenhouse 6920 Race 3507
Oil Station Engineering Co.
Land Title Bldg.
Rittenhouse 7440
Wayne Co. .....4030 N. Broad St.
Wyoming 3400

PUMPS—HYDRAULIC PUMPS

American Fluid Motors Co.
Aramingo & Cumberland Sts.
Regent 7140

PUMPS—POWER PUMPS

Goulds Pumps, Inc. .....111 N. 3d St.
Market 0515 Main 8849

PUMPS—ROTARY PUMPS

Eagan, Walter H. & Co. ..1612 Vine St.
Rittenhouse 7365 Race 9509

PUMPS—SCREW PUMPS

Quimby Pump Agency ...Atlantic Bldg.
Pennypacker 6234 Race 2676

PUMPS—STEAM PUMPS

American Steam Pump Co.
2401 Chestnut St.
Rittenhouse 9840
Elliot, Edwin & Co. ....560 N. 16th St.
Poplar 0747
Winterer, Herman L. ..943 N. Front St.
Market 6121 Park 2268

PUMPS—SUMP PUMPS

Stark Pump Co. .....Bourse Bldg.
Main 9351

PUMPS—VACUUM PUMPS

Eagan, Walter H. & Co. ..1612 Vine St.
Rittenhouse 7365 Race 9509
Kinney Mfg. Co. ..Commercial Tr. Bldg.
Rittenhouse 0475
Lebran Vacuum Pump Factory
511 Master St.
Diamond 4320

PUMPS—REPAIRS

Kruger & Blind Co. .....511 Master St.
Diamond 4320 Park 4333
Underwood, H. B., Corp
1025 Hamilton St.
Poplar 1870 Race 4034

PYROMETERS

Bristol Co. .....Widener Bldg.
Rittenhouse 2889
Brown Instrument Co.
Wayne & Roberts Aves.
Michigan 8300
Thwing Instrument Co.
3339 Lancaster Ave.
Evergreen 4823

QUARRIES—STONE QUARRIES

Butler & Orlando .....5747 Vine St.
Sherwood 3662
(See advertisement page 300)
Chestnut Hill Contracting & Graystone Quarry Co. .....9 E. Moreland Ave.
Chestnut Hill 0688
Fox-Croft Quarry Co. ..5321 Balti. Ave.
Granite 8511
Fox Croft Stone Co. ....4506 Regent St.
Woodland 1400
Mullen, Edw. A., Inc. .....5512 Vine St.
Sherwood 7971

RADIATORS—AUTOMATIC RADIATORS

Clow, Jas. B., & Sons ...1904 Sansom St.
Rittenhouse 8842 Race 5544

RADIATORS— CAST IRON RADIATORS

American Radiator Co. .25th & Reed Sts.
Oregon 8610 Race 7331
Burnham Boiler Corp. .....The Bourse
Lombard 9300
National Radiator Co. ..121 N. Broad St.
Locust 4236 Race 3317
Republic Radiator Co...2401 Chestnut St.
Rittenhouse 9840

RADIATORS—GAS FIRED RADIATORS

Frederick, Traugott & Allen, Inc.
1518 Vine St.
Rittenhouse 0916 Race 9533
Bryant Heater & Mfg. Co. .1518 Vine St.
Rittenhouse 0916 Race 9533
Comet Radiator Co. ....2010 Market St.
Rittenhouse 7230 Race 2939

RADIATORS—HOT WATER HEATING RADIATORS

Fowler & Wolfe Mfg. Co.
Bulletin Bldg.
Spruce 7330 Race 7901
Pierce, Butler & Pierce Mfg. Corp.
31st & Oxford Sts.
Poplar 8900 Park 4744

RADIATORS—STEAM HEATING RADIATORS

Fowler & Wolfe Mfg. Co. .Bulletin Bldg.
Spruce 7330 Race 7901
Pierce, Butler & Pierce Mfg. Co.
31st & Oxford Sts.
Poplar 8900 Park 4744

RADIATOR BRACKETS

Branch-Crawford Co......1539 Wood St.
Rittenhouse 6252 Race 1538

RADIATOR CABINETS

(See Cabinets—Radiator Cabinets)

RADIATOR CONCEALMENTS

Sylvester, W. H., & Son
1807 N. Howard St.
Garfield 0611
(See advertisement page 307)

RADIATOR SHIELDS

American Metal Products Corp.
104 S. 52d St.
Allegheny 4811
Gerken, J. D., Co. .....Jefferson Bldg.
Walnut 0686
(See advertisement page 117)
Hunter, Clarke D., Co. ...Widener Bldg.
Rittenhouse 7395
Sylvester, Wm. H., & Son
1807 N. Howard St.
Garfield 0611
(See advertisement page 307)
Modern Steel Products Co. .The Bourse
Lombard 9300
Radiator Cabinet Co. .....Drexel Bldg.
Lombard 4900
Vulcan Brazing & Machine Co.
2126 Race St.
Rittenhouse 1649 Race 7193

RAILINGS—BALCONY RAILINGS—HAND WROUGHT ORNAMENTAL IRON

Shannon Metalcraft Corp...11 Letitia St.
Walnut 2396
(See advertisement page 74)

RAILINGS—BALCONY RAILINGS—ORNAMENTAL BRONZE

Shannon Metalcraft Corp...11 Letitia St.
Walnut 2396
(See advertisement page 74)

RAILINGS—BRASS RAILINGS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Werner, Geo. F. ....5th St. bel. Vine St.
Market 4541 Main 2911

RAILINGS—IRON RAILINGS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Noe, Wm. L., Co. .....2d & Oxford Sts.
Regent 4730 Park 4877
(See advertisement page 34)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Clopp, Geo. B. .....3717 Filbert St.
Evergreen 4731 West 1147
(See advertisement page 34)

RAILINGS—PIPE RAILINGS

Associated Iron Works ...1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

RAILINGS—STAIR RAILINGS—ORNAMENTAL BRONZE

Shannon Metalcraft Corp. .11 Letitia St.
Walnut 2396
(See advertisement page 74)

RAILINGS—STAIR RAILINGS—HAND WROUGHT ORNAMENTAL IRON

Shannon Metalcraft Corp. .11 Letitia St.
Walnut 2396
(See advertisement page 74)

RANGES—COAL RANGES

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Hershey, John C. .....128 N. 21st St.
Rittenhouse 0209

RANGES—GAS RANGES

Acorn Gas Range Agency ..61 N. 2d St.
Market 2578
Colonial Stove Co. .....941 N. 2d St.
Market 4821
Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Hershey, John C. .....128 N. 21st St.
Rittenhouse 0209
Klein Stove Co. .....31-33 N. 2d St.
Market 1213 East 7931
Leiser Gas Stove Co., Inc. ..108 N. 2d St.
Market 0151 Main 7573
Phila. Gas Range Co. ....1026 Arch St.
Walnut 6912 Race 7560
Roberts & Mander Stove Co.
11th St. & Washington Ave.
Oregon 7680 Main 2541
Columbia Record Stove Co. .624 S. 2d St.
Lombard 4712 Main 9098

RED CEDAR CONSTRUCTION

Ward, Jos. T., Co. ....5809 Baynton St.
Germantown 3555
(See advertisement page 146)

REFLECTORS

Day Brite Reflector Co. ...235 S. 8th St.
Lombard 8368 Main 8027
Erikson, L., Elec. Co. ..1725 Sansom St.
Rittenhouse 8365
Frink, Co., Inc.
People's Bank & Trust Co. Bldg.
Rittenhouse 3882
Klemm Reflector Co. .....132 N. 5th St.
Lombard 9157
Pittsburgh Reflector Co. ..235 E. 8th St.
Lombard 8368 Main 8027
Viking Products Corp. ...Packard Bldg.
Spruce 3737

REFRACTORIES

(See Brick—Fire Brick)

REFRIGERATION—ELECTRIC REFRIGERATION

Champion Electro Icer Co.
2029 Market St.
Rittenhouse 1293 Race 9925
Copeland—Phila. Copeland Refrig. Co.
126 S. 16th St.
Rittenhouse 8875
Frigidaire—Frigidaire Distributors
810 N. Broad St.
Poplar 9613
General Electric—Judson C. Burns, Inc.
11th & Chestnut Sts.
Rittenhouse 1500
Kelvinator—Kelvinator-Phila. Co.
36 S. 17th St.
Rittenhouse 1900

REFRIGERATION EQUIPMENT

Carrier Engineering Corp.
Land Title Bldg.
Rittenhouse 5586 Race 7836

REGULATORS—DAMPER REGULATORS

Huyette, Paul B., Co., Inc. ..5 S. 18th St.
Rittenhouse 6007 Race 3520

REGULATORS—FEED WATER REGULATORS

McAlear Mfg. Co. .....810 Race St.
Walnut 6791 Main 9147
McDonnell & Miller ....2013 Sansom St.
Rittenhouse 8262

REGULATORS—HEAT REGULATORS

Honeywell Temperature Regulator
Dun-Fortune, Inc. ..3706 Lancaster Ave.
Evergreen 6481
Minneapolis Heat Regulator Co.
Bulletin Bldg.
Spruce 9228

REINFORCING BARS

(See Concrete Reinforcing Bars)

REVOLVING DOORS

(See Doors—Revolving Doors)

RENOVATORS—BUILDING RENOVATORS

(See Building Cleaning)

RIGGING

Orth, G .P. ....523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 112)
Adams, F. L., Co. ..19th & Walnut Sts.
Rittenhouse 1171
Adelphia Rigging Co. ..2207 N. 28th St.
Diamond 3946
Atkinson, Francis J. .....308 S. 4th St.
Lombard 5858
Bolger. Andrew, Co. .....232 Arch St.
Market 0210 Main 9114
Callaghan, C. C. .....155 N. 23d St.
Rittenhouse 7421
Cantley & Co. .....Harrison Building
Rittenhouse 8962
Clark & Co. .....1333 Unity St.
Jefferson 6711
Same ..Wingohocking & Adams Ave.
Franklin Transportation Co.
10th & Thayer Sts.
Tioga 6676 Park 4346
Henderson Trucking & Rigging Corp.
2514 Lombard St.
Locust 4960 Race 7192
McCourt, Joseph F. .....28 N. 5th St.
Lombard 8825
McGurk, Jas. H., Inc.
2d St. & Columbia Ave.
Regent 3288
McKeefrey, John A., Co. ..72 N. 4th St.
Market 3565 Main 6953
Thompson, Thos. J. .....112 N. 6th St.
Market 4912
Same .....869 N. 45th St.
Evergreen 3219 Main 5003

RIVETS

Atlas Iron & Steel Co. 1536 N. Del. Ave.
Regent 0890 East 8959
(See advertisement page 36)
Carlin, Anthony Co...20th & Venango Sts.
Tioga 6290 Park 5551
Champion Rivet Co.
Commercial Trust Bldg.
Rittenhouse 2044
Humphreys & Co.
Frankford & Torresdale Aves.
Jefferson 1125
Penn Rivet Corp. ..3d & Huntingdon Sts.
Regent 6790 Park 2066

RIVETS—Continued

Service Supply Corp.
20th & Venango Sts.
Tioga 6290 Park 5551
Townsend Co. .....Widener Bldg.
Rittenhouse 2474
Whitelaw, Wm. Co. .....228 N. 15th St.
Rittenhouse 9697 Race 9731

RIVETING

Van Duser, A. B. ..1247 N. Warnock St.
Stevenson 7560

RODS—LIGHTNING RODS

(See Lightning Rods)

ROOF SUMPS AND FLANGES

Boosey, Norman Mfg. Co.
5140 Hamilton Ave. Detroit, Mich.
No Philadelphia Office
(See advertisement page 70)

ROLLING STEEL DOORS

(See Doors—Rolling Steel Doors)

ROOFERS—COMPOSITION ROOFING

Martin & Breen, Inc. ..1613 Sansom St.
Rittenhouse 1554 Race 1190

ROOFERS—CORRUGATED ROOFING

Phila. Painting Contracting Co.
245 S. 9th St.
Pennypacker 4866 Main 5851

ROOFERS—SHEET METAL ROOFERS

Consolidated Cornice & Roofing Co.
2519 Moore St.
Oregon 0730
(See advertisement page 30)
Gassner, Thos. S., Co. ..4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Rath, Jacob & Son ..19 E. Chelten Ave.
Germantown 3840
Wahl, Geo. E. ..3939 Spring Garden St.
Evergreen 0956

ROOFERS—SHEET METAL ROOFERS—Continued

Kulzer, M. G. .....3005 N. Marshall St.
Tioga 3992
Belmont Cornice & Roofing Co.
4062 Aspen St.
Baring 1080
Bonsall's Sons, Wm. S. ..3826 Mkt. St.
Evergreen 7050
Boyle, James E. ....3331 Frankford Ave.
Garfield 3544M Race 6496
Decker, J. & Son ..2704 W. Girard Ave.
Poplar 4500
Dietz, C. A. ..Union & Baltimore Aves.
Lansdowne 2632
Gerbrick & Kaufman
American & Filbert Sts.
Market 6531 Main 7505
Haines, Geo. W. ..17th & Catharine Sts.
Oregon 5936 Race 1010
Randall, Howard ..815 E. Allegheny Ave.
Garfield 3373

ROOFERS—SLAG ROOFERS

Alexander-Johns Roofing & Mfg. Co.
1615 Stiles St.
Stevenson 0481 Park 4908
Campbell, Jas. F. ..2362 N. Lambert St.
Columbia 5670
Haman, Walter A. ....1918 E. Tioga St.
Regent 6856
Heebner, Geo. K. .....1231 Vine St.
Spruce 5013 Race 7108
Mulholland, James, Roofing Co.
5612 Loretta St.
Jefferson 8288
Mulholland, Francis
Trenton Ave. & Firth St.
Regent 8860 East 7460

ROOFERS—SLATE ROOFING

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Consolidated Cornice & Roofing Works
2519 Moore St.
Oregon 0730
(See advertisement page 30)
Dietz, C. A. ..Union & Baltimore Aves.
Lansdowne 2632
Fireproof Construction Co.
8th St. & Chelten Ave.
Waverly 5650
Haman, W. A. .....1918 E. Tioga St.
Regent 6856
Kockler & Warren .....5817 Gtn. Ave.
Germantown 9365

ROOFERS—TILE ROOFING

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Dietz, C. A. ..Union & Baltimore Aves.
Lansdowne 2632
Consolidated Cornice & Roofing Works
2519 Moore St.
Oregon 0730
(See advertisement page 30)
Fireproof Construction Co.
8th St. & Chelten Ave.
Waverly 5650
Kockler & Warren .....5817 Gtn. Ave.
Germantown 9365

ROOFERS—TIN ROOFING

Heebner, Geo. K. .....1231 Vine St.
Spruce 5013
Mahon, John G. ..4910-12 N. Fairhill St.
Michigan 3977
Sherman, Louis J. ....1211 N. Darien St.
Regent 4258
Taylor, Frank W., & Son ..259 S. 4th St.
Lombard 3510 Main 4508

ROOFING MATERIALS—ASBESTOS CORRUGATED ROOFING

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

ROOFING MATERIALS—ASBESTOS ROOFING MATERIAL

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Carey, Philip, Co.
24th St. & Sedgley Ave.
Tioga 8576 Park 5408
(See advertisement page 10)

ROOFING—ASBESTOS SHINGLE ROOFING

(See Shingles—Asbestos Shingles)

ROOFING MATERIALS—ASBESTOS —CONCRETE TILE

(See Tile—Asbestos—Concrete Tile)

ROOFING MATERIALS—ASBESTOS CORRUGATED ROOFING MATERIAL

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5263
(See advertisement page 64)

ROOFING—ASPHALT ROOFING

Carey, Philip, Co.
24th St. & Sedgley Ave.
Tioga 8576 Park 5408
(See advertisement page 10)

ROOFING—COPPER ROOFING

Hungerford, U. T. Brass & Copper Co.
46 N. 6th St.
Lombard 8780 Main 5746

ROOFING MATERIAL—FILMITE ROOFING MATERIAL

Carson Waterproofing Co.
1700 Walnut St.
Pennypacker 9265 Race 5148
(See advertisement page 146)

ROOFING—SHEET METAL ROOFING

American Tin & Terne Plate Co.
24th & Vine Sts.
Rittenhouse 7481 Race 1741
Berger, L. D., Co. .....59 N. 2d St.
Market 0555 Main 8714
Eagle Sheet Metal Works
2924 W. York St.
Columbia 6905
Fable & Co., Inc. .....510 N. 3d St.
Market 3002 Main 9067
Baral Hardware & Heating Co.
1022 Columbia Ave.
Stevenson 4620 Park 3825
Robertson, H. H., Co. .Rl. Est. Tr. Bldg.
Pennypacker 0582
Bennett, A. B., Co. ..1632 W. Thompson
Stevenson 4381
Cortwright Metal Roofing Co.
50 N. 23d St.
Rittenhouse 4864
DuBois, John A. .....1326 W. Tioga St.
Tioga 7494 Park 3151
Foley, Frank H. .....3540 N. G St.
Regent 1774
Hewitt, Frederick M. ...1700 Church St.
Jefferson 8044
Kaercher, Albert F. ...2906 Fletcher St.
Columbia 5585

ROOFING—SLAG ROOFING

Horrocks, Wm. B., Co.
Orthodox & Large Sts.
Jefferson 1255 East 8420
Keystone Slag Co. ....Land Title Bldg.
Rittenhouse 5575 Race 5594
Utilities Co. .....4934 N. 6th St.
Michigan 7698 Park 1094

ROOFING MATERIALS—SLATE ROOFING

Masters, C. W. .....Perry Bldg.
Rittenhouse 8166 Race 2714

ROOFING—TILE ROOFING

(See Tile Roofing—Tile)

ROCKWOOD AUTO SPRINKLERS

Rockwood Sprinkler Co.
Land Title Bldg.
Rittenhouse 9591

ROPE—MANILA ROPE

American Mfg. Co. ..Front & Shunk Sts.
Oregon 1520 Main 5858
Clark Bros. Mfg. Co., Inc.
34 N. Front St.
Market 2552 Main 2561
Coates & Rainear, Inc. ..244 N. 22d St
Rittenhouse 6930
Fitler, Edwin H., Co. .....517 Arch St.
Lombard 8877 Main 3289
Hoffman-Crown Mfg. Co.
312 Market St.
Lombard 0531 Main 1727
Winne, Frank W., & Son.42 N. Front St.
Market 3857 Main 8897

ROPE—WIRE ROPE

(See Cable—Steel Cable)

RUBBER FLOORS

(See Floors—Rubber Floors)

RUBBER TILE

Kennedy, David E., Inc.
1133 Real Estate Trust Bldg.
Pennypacker 2851 Race 2658

RUST PROOFING

Philadelphia A. Rust-Proof Co.
Hope St. & Montgomery Ave.
Regent 6186 Park 1413

RUUD WATER HEATERS

Bartlett & Co. .....1938 Market St.
Rittenhouse 6797 Race 2710

SAFES

Halls Safe Co. .....627 Chestnut St.
Lombard 6812
Hollar Co. .....Packard Bldg.
Spruce 2060 Race 9539
Riter Bros & Co. .....1022 Race St.
Walnut 2226 Race 4309
Stiffel & Freeman Safe Co.
723 Chestnut St.
Lombard 5687 Main 1900
York Safe & Lock Co. ..711 Chestnut St.
Lombard 8570 Main 3363
Remington & Sherman Co.
1545 N. Delaware Ave.
Regent 7626

SAFETY APPLIANCES—ELEVATOR SAFETY APPLIANCE

Otis Elevator Co. .....112 S. 16th St.
Rittenhouse 5500 Race 6941
(See advertisement page 108)
Jenkins Interlock Mfg Co.
13th & Hamilton Sts.
Poplar 8336

SAFETY APPLIANCES—MACHINERY GUARD

(See Guards—Machinery Guards)

SAFETY GLASS

(See Glass—Safety Glass)

SAFETY TREADS

American Mason Safety Tread Co.
400 Chestnut St.
Lombard 6151
Hammond, R. R. & Co. ..Widener Bldg.
Rittenhouse 0963

SAGER METAL WEATHERSTRIPS

Sager Metal Weatherstrip Co.
16th & Race Sts.
Rittenhouse 1721

SAND BLASTING

Atlas Sand Blast Co., Inc. 278 S. 60th St.
Sherwood 0380
Oesterle Stained Glass Works
327 N. 11th St.
Walnut 0678
Penna. Sand Blasting Co.
130 E. Rushcomb St.
Michigan 3023
Phila. Sand Blast Cleaning Co.
9th & Walnut Sts.
Pennypacker 8569
Van Duser, A. B. ..1247 N. Warnock St.
Stevenson 7560

SAND BLASTING EQUIPMENT

Tighman-Brookshank Sand & Blast Co.
1126 S. 11th St.
Oregon 1430

SAND—BUILDING SAND

Jarden, W. A. & Co.
55th St. & Lancaster Ave.
Belmont 0321 West 1926
Kelter, John H., Co. ..Tasker St. Wharf
Oregon 1513 Main 9111
Lotz, F. A. & Co. ..2137 N. American St.
Regent 6012 Park 2941
Phila. Transportation & Lighterage Co.
119 Walnut St.
Lombard 0178 Main 4394
Warner, Chas. Co. ..Franklin Tr. Bldg.
Rittenhouse 0842 Race 3379
West Jersey Sand & Supply Corp.
Beach & Marlboro Sts.
Regent 7120 East 8982

SANYMETAL PRODUCTS

Clancy, James A—Sales Agent
Harrison Bldg.
Spruce 7791

SASH—CASEMENT SASH

(See Windows—Casement Windows)

SASH—STEEL SASH

Allison Steel Products Co.
Harrison Bldg.
Rittenhouse 4580 Race 6136
Lupton's, David, Sons Co.
Allegheny Ave. & Tulip St.
Regent 9700 East 7951

SASH—STEEL SASH—Continued

Moister, M. & Co.
Hunting Park Ave. & American St.
Wyoming 4833 Park 2124
Detroit Steel Products Co.
1722 Ludlow St.
Rittenhouse 4937

SASH OPERATORS

Lupton's, David, Sons Co.
Allegheny Ave. & Tulip St.
Regent 9700 East 7951

SASH PULLEYS

(See Hardware—Builders Hardware)

SASH WEIGHTS

Brown, E. E. & Co., Inc.
McKean & Meadow Sts.
Oregon 1511 Main 3415
Phila. Sash Weight Works
East of Lewis & Ashland Sts.
Jefferson 6801 East 7089

SCAFFOLDING

McGhan Portable Scaffolding Co. Pa.
113 Arch St.
Market 3944
Patent Scaffolding Co. ..2835 Bridge St.
Jefferson 4501 East 8912

SCREENS—DOOR SCREENS

Higgon Mfg. Co. .....Lincoln Bldg.
Rittenhouse 2795 Race 1028

SCREENS—FIREPLACE SCREENS

Millership, Thos. E. .....3241 Gtn. Ave.
Tioga 3198

SCREENS—METAL FRAME SCREENS

Higgon Mfg. Co. .....Lincoln Bldg.
Rittenhouse 2795 Race 1028
Cincinnati Fly Screen Co. ..23 S. 52d St.
Sherwood 0768
Burrows, E. T. Co. .....4025 Market St.
Evergreen 4790

SCREENS—PERFORATED METAL SCREENS

Hendrick Mfg. Co. .....Harrison Bldg.
Rittenhouse 7874

SCREENS—WINDOW SCREENS

Cardwell, S. H. .....636 E. Locust Ave.
Victor 6961
Cincinnati Fly Screen Co. ..23 S. 52d St.
Sherwood 0768
Duer, F. L. .....1615 Sansom St.
Rittenhouse 1761
Higgin Mfg. Co. .....Lincoln Bldg.
Rittenhouse 2795 Race 1028
Huck-Gerhardt Co., Inc.
G & Luzerne Sts.
Regent 2886 Park 4151
Jackson Screen Co. ..10th & Tioga Sts.
Tioga 8320 Park 2375
Best-Bilt Co. .....7127 Grays Ave.
Woodland 4004
Colombe & Peters ....1603 Orthodox St.
Delaware 4965
Cunningham & Wurzer
2555 Carpenter St.
Jackson 3351
Kane Mfg. Co. ....3312 Lancaster Ave.
Evergreen 1399
Orsco Metal Weatherstrip Co.
4612 Walnut St.
Evergreen 3467
Rolscreen Co. ....1026 Land Title Bldg.
Rittenhouse 1508

SCREENS—WIRE SCREENS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Berko Bros. Co. ..Randolph & Wood Sts.
Market 0317 Main 9018
New York Screen Co.
844 N. Randolph St.
Market 0581

SCULPTORS

Brockhouse & Kerner ..253 S. Quince St.
Pennypacker 6378
Donato, Giuseppe .....716 Walnut St.
Lombard 5985
Fenton, Beatrice .....1523 Chestnut St.
Locust 8590
Florentine Art Plaster Co.
2211 Chestnut St.
Locust 0418
Grafly, Chas. .....20th & Cherry Sts.
Locust 1727
Heiner, Herman J...1100 Glenwood Ave.
Columbia 4387
Greier, Geo. J. .....1523 Poplar St.
Stevenson 4666

SCULPTORS—Continued

Milione, Louis .....121 S. 24th St.
Rittenhouse 1809
Portnoff, Alex .....718 Locust St.
Lombard 8466
Straubel, Harry .....700 Sansom St.
Walnut 3971
Voigt Co. .....1743 N. 12th St.
Stevenson 0600

SEPARATORS—OIL SEPARATORS

Griscom-Russell Co. ...Land Title Bldg.
Rittenhouse 1880

SEPARATORS—STEAM SEPARATORS

Griscom-Russell Co. ...Land Title Bldg.
Rittenhouse 1880
Wright-Austin Co. .....500 N. 16th St.

SEWAGE DISPOSAL SYSTEMS

Cooney Engineering Co.
Real Estate Trust Bldg.
Pennypacker 1444
Harrison, Mertz & Emlen, Inc.
1713 Sansom St.
Rittenhouse 7244 Race 7645
Vattieri, B., & Pontarelli, A., & Co.
523 Rising Sun Ave.
Michigan 6087

SEWER PIPE

(See Pipe—Sewer Pipe)

SHEET IRON

(See Iron—Sheet Iron)

SHEET METAL WORK

Consolidated Cornice & Roofing Co.
2519 Moore St.
Oregon 0730
(See advertisement page 30)
Kulzer, M. G. .....3005 N. Marshall St.
Tioga 3992
Carolina Sheet Metal Works
3009 Chestnut St.
Evergreen 5343 West 1825
Acme Sheet Metal Works
5406 Jefferson St.
Belmont 0618

SHEET METAL WORK—Continued

American Sheet Metal Works
6350 Greenway Ave.
Woodland 0801

Atlantic Sheet Metal Works
1005 Ridge Ave.
Walnut 2233 Race 3613

Baring Sheet Metal Works
416 N. Wiota St.
Baring 1704 West 1029

Belmont Cornice & Roofing Co.
4062 Aspen St.
Baring 1080

Boyle, James E. ....3331 Frankford Ave.
Garfield 3544M

Callahan, Frank A. .....251 N. 2d St.
Market 3715 Main 8456

Cortwright Metal Roofing Co.
50 N. 23d St.
Rittenhouse 4864

Eagle Sheet Metal Works
2924 W. York St.
Columbia 6905

English, W. J., & Bro. .326 N. Water St.
Market 4143

Globe Sheet Metal Works
203 S. Front St.
Lombard 0579

Guenther, R., & Son ....1637 N. 13th St.
Stevenson 0413 Park 1485

Haines, Geo. W. ..17th & Catharine Sts.
Oregon 5936 Race 1010

Hess & Co. ..Gaul & Westmoreland Sts.
Regent 4213

Hewitt, Frederick M. ...1700 Church St.
Jefferson 8044

Jacobus, Harry .....90 E. Haines St.
Germantown 0338

Kastrup, A. & J. C. .....93 Moore St.
Oregon 6830 Main 5048

Kastrup, Charles .....144 Wolf St.
Jackson 1279

Salinger, Charles .....1110 Ridge Ave.
Poplar 1138 Race 3405

Schweiker, Wm. G., Sons, Inc.
2621 Jefferson St.
Stevenson 5073 Park 1016

Sheet Metal Specialty Co.
3040 W. York St.
Columbia 6840

Stern Metal Works .....1006 Vine St.
Walnut 1212

Wegmann, A. & W.
2813 W. Fletcher St.
Columbia 4936

SHEET METAL WORK—SPECIAL FACTORY EQUIPMENT

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

SHEET METAL WORK—SPECIAL OFFICE EQUIPMENT

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

SHEET METAL WORK—SPECIAL SHEET METAL WORK UP TO ½ INCH THICK

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

SHEETROCK FIREPROOF WALL-BOARD

Elwood, Allen, Lumber Co.
Trenton Ave. & Ann Street
Regent 1150 East 7761

Felin, Chas. F., & Co., Inc.
York Rd. & Butler St.
Michigan 3150 North 0601

Pearce Fireproof Co. .....1911 N. 2d St.
Regent 9840 Park 1115

SHELVING—STEEL SHELVING

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

Berger Mfg. Co. ..16th St. & Wash. Ave.
Oregon 1443 Race 7495

Darby Steel Equipment Co.
1922 Germantown Ave.
Columbia 4464 Park 4626

Durand Steel Locker Co. ..Cunard Bldg.
Pennypacker 1432

Fow Mfg. & Supply Co., Inc.
Water & Mifflin Sts.
Oregon 8340 Main 7617

General Fireproofing Co.
Packard Bldg.
Rittenhouse 2422

Lyon Metallic Mfg. Co.
820 City Centre Bldg.
Spruce 8173

Lupton's, David, Sons Co.
Allegheny Ave. & Tulip St.
Regent 9700 East 7951

SHELVING—STEEL SHELVING—Continued

Medart, Fred, Mfg. Co...617 Ledger Bldg.
Lombard 0248 Main 5012
Parent Metal Products Co...134 N. 4th St.
Market 0713 Main 6790

SHINGLES—ASBESTOS SHINGLES

Asbestos Shingle, Slate & Sheathing Co.
Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Carey, Philip, Co.
24th St. & Sedgley Ave.
Tioga 8576 Park 5408
Fireproof Construction Co.
8th St. & Chelten Ave.
Waverly 5650
Phila Asbestos Co. .....2010 N. 10th St.
Columbia 5434 Park 4065

SHINGLES—ASPHALT SHINGLES

Acme Tin Plate & Roofing Supply Co.
2401 N. 10th St.
Diamond 8530 Park 1629
Carey, Philip, Co. ..24th & Sedgley Ave.
Tioga 8576 Park 5408
(See advertisement page 10)
Barber Asphalt Co. .....1600 Arch St.
Rittenhouse 9000
Crawford Roofing Supply Co.
2348 N. 15th St.
Columbia 9269
Devitt, Paul J. .....1101 S. 2d St.
Lombard 2363

SHINGLES—STAINED SHINGLES

Cabot, Samuel, Inc. ..Real Est. Tr. Bldg.
Pennypacker 3517 Race 5501
Weatherbest Stained Shingle Co.
1017 N. Front St.
Market 1584

SHINGLES—WOOD SHINGLES

(See Lumber—Building Lumber)

SHOWER BATH CURTAINS

Goldstein Bros. .....508 Arch St.
Lombard 9109

SHOWER BATH STALLS—METAL SHOWER BATH STALLS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

SHOWER TRAPS—SEEPAGE SHOWER TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
No Philadelphia Office
(See advertisement page 70)

SHUTTERS—STEEL SHUTTERS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)

SIDING

(See Lumber—Building Lumber)

SIGNS—ELECTRIC SIGNS

Viking Products Co. ....Packard Bldg.
Spruce 3737

SIGNS—ROOF SIGNS

Viking Products Co. .....Packard Bldg.
Spruce 3737

SILENT AUTOMATIC OIL BURNER

Silent Automatic Corp. 1624 Chestnut St.
Rittenhouse 2523
(See advertisement page 6)

SINKS—ACID RESISTANT SINKS

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

SINK TRAPS—ACID RESISTANT SINK TRAPS

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

SKYLIGHTS

Gassner, Thos. S., Co. ..4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Acme Sheet Metal Works
5406 Jefferson St.
Belmont 0618
Consolidated Cornice & Roofing Co.
2519 Moore St.
Oregon 0730

SKYLIGHTS—Continued

Crawford Roofing Supply Co.
2348 N. 15th St.
Columbia 9269
Decker, J. & Son ..2704 W. Girard Ave.
Poplar 4500 Race 6496
Eachus, Jamison & Fender .67 Laurel St.
Market 0343
Gara-McGinley Co. .....218 N. 13th St.
Spruce 3896 Race 7054
John, Benjamin F., Co. ..1003 Race St.
Walnut 5680 Race 5572
Johnston, T. S., Sons Co. 626 Cherry St.
Market 5538 Main 1154
Kaercher, Albert F. ..2906 Fletcher St.
Columbia 5585
Robertson, H. H., Co.
Real Estate Trust Bldg.
Pennypacker 0582
Schuch, John L. .....3115 N. 16th St.
Tioga 3654
Thorn, J. S., Co.
20th St. & Allegheny Ave.
Tioga 8532 Park 4694
Jones, Alexander, Roofing & Mfg. Co.
1615 Stiles St.
Stevenson 0481
Randall, Howard ..815 E. Allegheny Ave.
Garfield 3373

SKYLIGHTS—ROLLED STEEL PUTTYLESS SKYLIGHTS

Gassner, Thos. S., Co. .4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

SLAG

Duquesne Slag Products Co.
Commercial Trust Bldg.
Rittenhouse 0231
Keystone Slag Co. .....Land Title Bldg.
Rittenhouse 5575 Race 5594
National Slag Co. .....Jefferson Bldg.
Walnut 4937 Race 7622

SLATE—INTERIOR SLATE

Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)
Emack, John D., Co. ....112 S. 16th St.
Rittenhouse 5420 Race 1029
Structural Slate Co. ....406 Perry Bldg.
Rittenhouse 8166 Race 2714

SLATE—ROOFING SLATE

Binckley, R. A. .....413 Perry Bldg.
Rittenhouse 8853
Emack, John D., Co. .....112 S. 16th St.
Rittenhouse 5420 Race 1029
Masters, C. W. .....406 Perry Bldg.
Rittenhouse 8166 Race 2714
Moore, Wm. Co. .....1516 Sansom St.
Rittenhouse 7661 Race 5351

SEWER CONSTRUCTION

Neely, M. Y., Inc.
Bustleton Pike S. Belsalm Pike
Bustleton 0678

SHOVELS—POWER SHOVELS—ELECTRIC POWER SHOVELS

Bay City Dredge Works..Morris Bldg.
Rittenhouse 6944
Erie Steam Shovel Co.
Commercial Trust Bldg.
Rittenhouse 2860
Harnischfeger Sales Corp.
5102 Lancaster Ave.
Belmont 9795 West 3950
Marion Steam Shovel Co.
31st & Chestnut Sts.
Evergreen 8100 West 1141
Osgood Co. .....Land Title Bldg.
Rittenhouse 6650 Race 5088
Ward, Lee T., Co. .....619 Filbert St.
Lombard 9009 Main 7789

SHOVELS—POWER SHOVELS—STEAM POWER SHOVELS

Erie Steam Shovel Co.
Commercial Trust Bldg.
Rittenhouse 2860
Marion Steam Shovel Co.
31st & Chestnut Sts.
Evergreen 8100 West 1141
McMyler Interstate Co. .....Fox Bldg.
Rittenhouse 4115
Mullen, Edw. A., Inc. ....5512 Vine St.
Sherwood 7971

SHOVELS—POWER SHOVELS—STEAM POWER SHOVELS

Osgood Co. .....Land Title Bldg.
Rittenhouse 6650 Race 5088

SLATE—BLACKBOARD SLATE

Binckley, R. A. .....413 Perry Bldg.
Rittenhouse 8853

SLATE—FLAGGING SLATE

Emack, John D., Co. .....112 S. 16th St.
Rittenhouse 5420 Race 1029
Masters, C. W. .....406 Perry Bldg.
Rittenhouse 8166 Race 2714

SLATE—STRUCTURAL SLATE

Henry, E. P., Co. .....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)
Binckley, R. A. .....413 Perry Bldg.
Rittenhouse 8853
Emack, John D., Co. .....112 S. 16th St.
Rittenhouse 5420 Race 1029
Structural Slate Co. .....406 Perry Bldg.
Rittenhouse 8166 Race 2714

SLATE—VERMONT SLATE

Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)

SOUND DEADENING

Cabot, Samuel, Inc. ...Rl. Est. Tr. Bldg.
Pennypacker 3517 Race 5501
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150 Race 2731

SOUND PROOFING

Rosenblatt, M. C., Co. ..1700 Walnut St.
Pennypacker 8636
Zellfelder, Albert .....1324 Walnut St.
Pennypacker 1150 Race 2731

SPECIFICATION TYPING

Hurff, Ella S. .....Rl. Est. Tr. Bldg.
Pennypacker 3683

SPOUTING

Bennett, A. B., Co.
1632 W. Thompson St.
Stevenson 4381
Boyle, James E. ....3331 Frankford Ave.
Garfield 3544
Foley, Frank H. .....3540 N. G St.
Regent 1774

SPRINKLER SYSTEMS—AUTOMATIC FIRE SPRINKLER SYSTEMS

Boon & Sample, Inc. ...3008 Ludlow St.
Evergreen 7885 West 1997
Central Automatic Sprinkler Co.
5145 Delancey St.
Granite 5643 North 0631
Grinnell Co. .....414 Walnut St.
Lombard 6794 Main 5182
Globe Automatic Sprinkler Co.
2035 Washington Ave.
Jackson 0531
Independent Aetna Sprinkler Co.
2325 N. 11th St.
Diamond 6818 Park 4888
Jellett, Stewart A., Co. ..1200 Locust St.
Pennypacker 8992
Raisler Sprinkler Co. Chestnut & 5th Sts.
Lombard 7973
Rockwood Sprinkler Co.
Land Title Bldg.
Rittenhouse 9591
Sprinkler Equipment Corp.
Westmoreland & Collins Sts.
Regent 7896 East 8934
Vogel, H. G., Co. ..25-27 S. Orianna St.
Lombard 1517 Main 4273
Automatic Sprinkler Corp. of America
437 Walnut St.
Lombard 2240
General Engineering & Const. Co.
Perry Bldg.
Rittenhouse 7035 Race 4550

STACKS—BRICK STACKS

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 36)
American Chimney Corp.
Stephen Girard Bldg.
Rittenhouse 0924 Race 3410
Ballard, Sprague & Co., Inc.
Morris Bldg.
Rittenhouse 9730
Rust Engineering Co...1015 Chestnut St.
Walnut 3068
Williams, Wm. E., & Son
2134 Market St.
Rittenhouse 3827

STACKS—IRON STACKS

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 36)

STACKS—IRON STACKS—Continued

Connery & Co. .....2d & Luzerne Sts.
Regent 2794 Park 2021
Phila. Boiler Works .....1737 Filbert St.
Rittenhouse 3854 Race 2511
Quaker City Iron Works
Tioga & Richmond Sts.
Regent 6841 East 7884

STACKS—STEEL STACKS

Coatesville Boiler Works .Packard Bldg.
Rittenhouse 2097
Connery & Co. .....2d & Luzerne Sts.
Regent 2794 Park 2021
Phila. Boiler Works ....1737 Filbert St.
Rittenhouse 3854 Race 2511
Van Duser, A. B. ....638 W. Girard Ave.
Market 4893

STACK BUILDER

Van Duser, A. B. ....638 W. Girard Ave.
Market 4893

STACK DISMANTLING

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 36)

STACK ERECTING

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 36)
Boiler Service & Repair Co.
3343 N. Carlisle St.
Tioga 7767 Park 4934
Hitner's Sons, Henry A.
4501 Richmond St.
Jefferson 4800 East 7781

STACK FITTINGS—BASE FITTINGS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
No Philadelphia Office
(See advertisement page 70)

STACK PAINTING

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 36)

STACK REPAIRING

Atkinson, Francis J. .....308 S. 4th St.
Lombard 5858
Hassler, Jack .....1361 Ridge Ave.
Poplar 3808

STAINED GLASS

(See Glass—Stained Glass)

STAINED SHINGLES

(See Shingles—Stained Shingles)

STAINS

Nice, Eugene E., Co. .....268 S. 2d St.
Lombard 1877 Main 5852
(See advertisement page 28)

STAIRS—IRON STAIRS

Associated Iron Works ....1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
Ward, Jos. T., Co. ....5809 Baynton St.
Germantown 3555
(See advertisement page 146)
Aubel, F. & E. ..2503 Germantown Ave.
Columbia 8158 Park 2316
Humphreys & Co.
Frankford & Torresdale Aves.
Jefferson 1125 East 2124
Whartenby, Harry A.
1823 Brandywine St.
Poplar 8660

STAIRS—STEEL STAIRS

Reisbord, W. .....138 N. 55th St.
Allegheny 5520 West 1371
Whartenby, Harry A.
1823 Brandywine St.
Poplar 8660

STAIRS—WOOD STAIRS

Arrigale, Lawrence & Son
14 W. Thompson St.
Regent 4371
Felin, Charles F. & Co., Inc.
York Road above Butler St.
Michigan 3150 North 0601
Greene, Edward A. & Co., Inc.
2637 W. Hagart St. above York Rd.
Columbia 6264 Park 4123

STAIR REPAIRS

Laub, W. A. Co. .....1700 Walnut St.
Pennypacker 4747

STATUARY

American Statuary & Decorating Co.
American & Ionic Sts.
Lombard 4552 Main 6045
Modern Tuscany Art Co., Inc.
211 S. 9th St.
Pennypacker 6156 Main 4991
O'Connell & Co. ....1308 N. Orianna St.
Regent 5797 Park 2162
Pellegrini, L. & Co. .....218 S. 8th St.
Pennypacker 2844
Penna. Statuary Co. .....725 N. 2d St.
Market 1470 Park 4093

STEAM FITTING

Boon & Sample, Inc. ..3008 Ludlow St.
Evergreen 7885 West 1997
Dougherty, James ..5812 Belmar Terrace
Woodland 2051-W
Forrest, Richard ..Mascher & Norris Sts.
Regent 1870
Gormly, P., Co. .....155 N. 10th St.
Walnut 0561 Race 2793
Lukens, Thompson H. ..321 S. 13th St.
Pennypacker 5983 Race 4711
Roberts, Henry L. .....228 N. 16th St.
Rittenhouse 7831 Race 4258

STEAM HEATERS

(See Heaters—Steam Heaters)

STEAM SHOVELS

(See Shovels—Power Shovels)

STEAM SHOVEL CONTRACTORS

(See Contractors—Steam Shovel Contractors)

STEEL

Hitner's Sons Co., Henry A.
Gaul & Huntingdon Sts.
Regent 1865 East 9025
(See advertisement page 327)

STEEL—BAR STEEL

DeCou, Richard, Co.
11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)

STEEL—BAR STEEL—Continued

American Steel Engineering Co.
Fuller Bldg.
Rittenhouse 8832 Race 5714
Atlas Iron & Steel Co. ..1536 N. Del. Ave.
Regent 0890 East 8959
Morris Wheeler & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601
Nicetown Plate Washer Co.
1824 W. Juniata St.
Michigan 1736 North 0687
Penn Seaboard Steel Corp.
Franklin Bank Bldg.
Rittenhouse 6363
Whitelaw, Wm. Co. ....228 N. 15th St.
Rittenhouse 9697 Race 9731

STEEL—BEAMS, ANGLES & CHANNELS—STEEL

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

STEEL CONSTRUCTION

Baumann, A. C. .....7011 Grays Ave.
Woodland 0685

STEEL—PLATE STEEL

By-Products Steel Corp.
Commercial Trust Bldg.
Rittenhouse 4173
Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Fritch, R. B. & Co. ..3d & Venango Sts.
Regent 1006 Park 4910
Morris Wheeler & Co.. Inc.
30th & Locust Sts.
Evergreen 5900 West 1601

STEEL—REINFORCING STEEL

Taylor, A., Co. ..D St. above Erie Ave.
Regent 4024 Park 2391
(See advertisement page 52)
Baker Warehouse ....G & Venango Sts.
Regent 8474 East 7281
Consolidated Expanded Metal Co.
1083 Germantown Ave.
Market 1468 Park 4188
Kalman Steel Co. .....1713 Sansom St.
Rittenhouse 5747 Race 1776

STEEL—REINFORCING STEEL—Continued

Morris Wheeler & Co.
30th & Locust Sts.
Evergreen 5900 West 1601
Penn Steel Service Co. ....Fuller Bldg.
Rittenhouse 4955 Race 3597

STEEL—SHAPES—STEEL

DeCou, Richard, Co. 11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)

STEEL—STRUCTURAL STEEL

Atlas Iron & Steel Co. ..1536 N. Del. Ave.
Regent 0890 East 8959
(See advertisement page 36)
Cantley & Co. .....Harrison Bldg.
Rittenhouse 8962 Race 6640
(See advertisement page 69)
DeCou, Richard, Co.
11th & Hamilton Sts.
Poplar 8110 Race 7711
(See advertisement page 324)
Hitner's Henry A., Sons Co.
Gaul & Huntingdon Sts.
Regent 1865 East 7781
(See advertisement page 327)
Montgomery Iron & Steel Co.
2500 Duncan St.
Delaware 4995 East 7905
(See advertisement page 324)
Liberi, Domenick & Sons
1137 S. Broad St.
Oregon 8062 Race 2618
(See advertisement page 300)
Allen Iron & Steel Co.
3d & Venango Sts.
Garfield 3255 Park 5479
American Steel Engineering Co.
Fuller Bldg.
Rittenhouse 8832 Race 5714
Aubel, F. & E. .....2503 Gtn. Ave.
Columbia 8158 Park 2316
Baker Warehouse ....G & Venango Sts.
Regent 8474 East 7281
Belmont Iron Works
22d St. & Washington Ave.
Oregon 0510 Race 6471
Brownworth & Co. ....1611 Sansom St.
Rittenhouse 6156 Race 4305
American Bridge Co. ....Widener Bldg.
Rittenhouse 1400 Race 7701
Fritch, R. B., & Co. ..3d & Venango Sts.
Regent 1006 Park 4910

STEEL—STRUCTURAL STEEL—Continued

Lederle, Robert B., & Co.
Witherspoon Bldg.
Pennypacker 1274 Race 5879
Morris Wheeler, & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601
Shippers Car Line Corp.
Commercial Trust Bldg.
Rittenhouse 5610
Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)
Steel Service Co. .....Fox Bldg.
Rittenhouse 3212
Structural Steel Service Co.
34 S. 17th St.
Rittenhouse 3486
Bethlehem Fabricators, Inc.
312 S. Broad St.
Pennypacker 7560 Race 7019
Davies, John J., & Co.
20th & Clearfield Sts.
Tioga 2199
Hall, L. Norris .....940 N. Front St.
Market 5273 Park 4146
Lehigh Structural Steel Co.
Harrison Bldg.
Spruce 3459
Liberi, Salvatore, & Co. .1225 Federal St.
Jackson 4070 Race 1820
Livezey, Thos. H., & Co.
American & Luzerne Sts.
Michigan 2300
Matthews, S. G., & Son
2016 W. Lippincott St.
Tioga 2397 Park 3969
Parvin & Co. .....Stephen Girard Bldg.
Rittenhouse 2841 Race 3441
Reichert, Emil, Co. ....1230 Summer St.
Spruce 0350
Standard Structural Steel Co.
131 N. 15th St.
Rittenhouse 6933

STEEL—WIRE FABRIC CONCRETE REINFORCEMENT

National Steel Fabric Co.
Franklin Trust Bldg.
Rittenhouse 1161

STEEL BUILDINGS

(See Buildings—Portable—Iron & Steel)

STEEL CABINETS
(See Cabinets—Steel Storage Cabinets)

STEEL CABLE
(See Cable—Steel Cable)

STEEL CASEMENTS
(See Windows—Casement Windows)

STEEL CEILINGS
(See Ceilings—Metal Ceilings)

STEEL ERECTION
(See Contractors—Steel Erection Contractors)

STEEL JOISTS
(See Joists—Steel Joists)

STEEL LOCKERS
(See Lockers—Steel Lockers)

STEEL PARTITIONS
(See Partitions—Steel Partitions)

STEEL PIPE
(See Pipe—Steel Pipe)

STEEL PLATE CONSTRUCTION

Coatesville Boiler Works .Packard Bldg.
Rittenhouse 2017
Connery & Co. .....2d & Luzerne Sts.
Regent 2794 Park 2021
Tippett & Wood .....Harrison Bldg.
Spruce 9006

STEEL RIGGERS
(See Rigging)

STEEL SASH
(See Sash—Steel Sash)

STEEL SHELVING
(See Shelving—Steel Shelving)

STEEL STAIRS
(See Stairs—Steel Stairs)

STEEL STEPS
(See Steps—Steel Steps)

STEEL TUBES
(See Tubes—Steel Tubes)

STEEPLEJACKS

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 112)

STEPS—STEEL STEPS

Blaw-Knox Co., Inc. ....Widener Bldg.
Rittenhouse 5728

STOKERS—HAND STOKERS

Elliot, Edwin, & Co. ....560 N. 16th St.
Poplar 0747
Huber Stoker Co. .....Perry Bldg.
Rittenhouse 4979

STOKERS—MECHANICAL STOKERS

Huber Stoker Co. .....Perry Bldg.
Rittenhouse 4979
Riley Stoker Corp. .....St. Girard Bldg.
Rittenhouse 2907

STONE—ALBERENE STONE

Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)

STONE—ARTIFICIAL STONE
(See Stone—Cast Stone)

STONE—BROWN STONE

Dodds, John A., Inc. ..2929 Ellsworth St.
Oregon 0764 Race 1176
(See advertisement page 128)

STONE—CAST STONE

Christensen, Adolph ....1433 Brown St.
Poplar 0153
(See advertisement page 142)
Eastern Cast Stone Co.
3308-10 Ludlow St.
Evergreen 1153

STONE—CAST STONE—Continued

Phila. Cast Stone Co.
American & Bristol Sts.
Michigan 5970 Park 4951

Weiss, Philip
Fishers Ave. & Mascher St.
Michigan 2356

Cavalieri, Leopoldo .....513 N. 63d St.
Granite 4892

Economy Concrete Co. ..Flanders Bldg.
Spruce 1282

Formigli Architectural Stone Co.
Real Estate Trust Bldg.
Pennypacker 0564

Jeffery, E. A. .....34 S. 16th St.
Rittenhouse 9898 Race 5178

Solidifier Corp. .....33d & Walnut Sts.
Evergreen 1500

STONE—CUT STONE

Dodds, John A., Inc. ..2929 Ellsworth St.
Oregon 0764 Race 6979
(See advertisement page 128)

Bradley, J. F. .....1121 Fillmore St.
Jefferson 1072

Ingalls Stone Co. .....1015 Chestnut St.
Walnut 2567

Maxwell's, John, Sons
30th St. bel. Spruce St.
Evergreen 2304 West 1188

Quaker City Cut Stone Co.
53d St. & Willows Ave.
Allegheny 1451

Ridgway, B., & Son ....4300 Clarissa St.
Michigan 4966

Trimble, Wm. S. ..3d & Allegheny Ave.
Regent 4541

Clark-Conroy Co. .....1121 Fillmore St.
Jefferson 1072

Davine, P. R., Cut Stone Co.
2859 Tulip St.
Regent 6548

D'Lauro, John ....55 E. Mermaid Lane
Chestnut Hill 0227

Dolan Bros. .....33d & Oakford Sts.

Donata, C. D., Cut Stone Co.
1121 Fillmore St.
Jefferson 1072

Drew, Wm. C. & Son ....6363 Chew St.
Germantown 1001 North 0139

Economy Concrete Co. ..Flanders Bldg.
Spruce 1282

Gray, Wm., & Sons, Co.
30th St. bel. Walnut St.
Evergreen 2369 West 2945

Hastings & Morrison ..1510 Wash. Ave.
Oregon 0922 Race 1065

Purnell, Chas., & Son ....922 S. 15th St.
Oregon 8754

STONE—CRUSHED STONE

Lavino, E. J., & Co. .....Bullitt Bldg.
Lombard 5600

Stowe Trap Rock Co.
Real Estate Trust Bldg.
Pennypacker 4901

STONE—FLAG STONE

Ambastone Co. .....112 S. 16th St.
Rittenhouse 9222

Maxwell's, John, Sons
30th St. bel. Spruce St.
Evergreen 2304 West 1188

Ridgway, B., & Son ....4300 Clarissa St.
Michigan 4966

Robinson, J. G. ..6202 Germantown Ave.
Germantown 4630 North 0003

STONE CLEANING

(See Building Cleaning)

STONE CONTRACTORS—STONE

(See Contractors—Cut Stone Contractors)

STONE POINTING

(See Pointing—Stone Pointing)

STONE MASONRY

(See Contractors—Masonry Contractors)

STONEWARE—ACID RESISTANT

CHEMICAL STONEWARE
(Knight-Ware)
BRICK
DRAIN PIPE
FITTINGS
SINKS
TRAPS
VENTILATING FLUES

Knight, M. A., Manufacturer .Akron, O.
Philadelphia representatives:
Wilson, Edward B.

Brown, Comfort E. ....1228 Spruce St.
Pennypacker 6983

STORE FIXTURES

(See Fixtures—Store Fixtures)

STORE LADDERS
(See Ladders—Rolling Store Ladders)

STORM PORCHES

Huck-Gerhardt, Co., Inc.
G & Luzerne Sts.
Regent 2836 Park 4151
Kaiser, Fredk.
248 W. Wingohocking St.
Wyoming 7355

STOVES—COOKING STOVES

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Spear, Jas., Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629

STOVES—GAS STOVES

Cox, Abram, Stove Co.
American & Dauphin Sts.
Regent 0830 Park 5486
Leiser Gas Stove Co., Inc. ..108 N. 2d St.
Market 0151 Main 7573
Roberts & Mander Stove Co.
11th St. & Washington Ave.
Oregon 7680 Main 2541
Spear, Jas., Stove & Heating Co.
1823 Market St.
Rittenhouse 7044 Race 1629
Star Stove Shops, Inc. .....Fox Bldg.
Rittenhouse 9120

STRAUB PATENT CINDER BLOCKS

Phila. Partition & Building Block Co.
28th & Ritner Sts.
Jackson 6278 Race 1534
(See advertisement page 60)

STREET OPENINGS—PLUMBERS' STREET OPENINGS—COMPRESSED AIR

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

STRUCTURAL ENGINEERS
(See Engineers—Structural Engineers)

STRUCTURAL STEEL
(See Steel—Structural Steel)

STRUCTURAL STEEL WORK

Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 302)

STUCCO

California Stucco Products Co.
1316 Olive St.
Poplar 3523 Park 3006
(See advertisement page 142)
Christensen, Adolph ....1433 Brown St.
Poplar 0153
(See advertisement page 142)
Keystone Stucco Mfg. Co., Inc.
Paschall & Lloyd Sts.
Woodland 1067 West 2900
Rastelli & Amadio .....1312 S. Mole St.
Jackson 0818
Roc Bond Co. .....780 S. 52d St.
Allegheny 6550

STUCCO MANUFACTURERS

California Stucco Products Co.
1316 Olive St.
Poplar 3523 Park 3006
(See advertisement page 142)

STUCCO WORK

Christensen, Adolph ....1433 Brown St.
Poplar 0153
(See advertisement page 142)
Christopher, James G.
26 E. Callom St.
Victor 1706
Quinn, James A. ..3531 Lancaster Ave.
Evergreen 3468
Seville Studios, Inc. ....3413 Walnut St.
Evergreen 4493

SURVEYORS

Koehler, Kemp & Koehler
416 Walnut St.
Lombard 2935
Robinson, R. W. .....Prod. Exch. Bldg.
Lombard 4559
Watters, W. ...Produce Exchange Bldg.
Lombard 4559
Webster, Clement B. ....7940 Fkd. Ave.
Holmesburg 2000 Main 8384
Williamson, Alex F. .....416 Walnut St.
Lombard 2935

SURVEYORS' INSTRUMENTS

Dietzgen, Eugene, Co. ..1521 Sansom St.
Rittenhouse 9020 Race 5529
Williams, Brown & Earle, Inc.
918 Chestnut St.
Pennypacker 7320 Main 7261

SWITCHES—ELECTRIC SWITCHES

(See Electric Supplies)

SWITCHBOARDS—ELECTRIC SWITCHBOARDS

(See Electrical Equipment)

SWITCHBOARD MATERIAL

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

SWORD OIL BURNER

Sword-Burners, Inc. ....4535 N. Broad St.
Michigan 3183

TABLETS & LETTERS—BRONZE

(See Bronze Tablets & Letters)

TANKS—CAST IRON TANKS

Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7825

TANKS—GASOLINE TANKS

Eastern Oil Equipment Co.
Land Title Bldg.
Rittenhouse 7426
Quaker City Iron Works
Tioga & Richmond Sts.
Regent 6841 East 7884
Wayne Co. .....4030 N. Broad St.
Wyoming 3400

TANKS—IRON TANKS

Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Hahn Engineering Co.
20th St. & Indiana Ave.
Columbia 7825
Phila. Boiler Works ....1737 Filbert St.
Rittenhouse 3854 Race 2511

TANKS—SEPTIC TANKS

Stroudsburg Septic Tank Co.
328 Chestnut St.
Lombard 2847

TANKS—STEEL TANKS

Coatesville Boiler Works Packard Bldg.
Rittenhouse 2017
Connery & Co., Inc. ..2d & Luzerne Sts.
Regent 2794 Park 2021
Crain Pump & Lumber Co. 17 N. 7th St.
Lombard 9525 Main 9184
Orth, G. P. ...523 W. Susquehanna Ave.
Columbia 5469
(See advertisement page 112)
Keystone Boiler Works, Inc.
1322 N. 9th St.
Rittenhouse 2349 Park 2254
Lancaster Iron Works, Inc.
Land Title Bldg.
Rittenhouse 3237
Machold & Riddell ....St. Girard Bldg.
Rittenhouse 2154
Phila. Boiler Works ....1737 Filbert St.
Rittenhouse 3854 Race 2511
Quaker City Iron Works
Tioga & Richmond Sts.
Regent 6841 East 7884

TANKS—WELDED TANKS

Janney, Steinmetz, & Co.
1421 Chestnut St.
Rittenhouse 2720 Race 7979
Kinkaid, John A. ..49 W. Rittenhouse St.
Germantown 0209

TANKS—WOOD TANKS

Hall, Amos H., & Sons
Erie Ave. & F Sts.
Garfield 3178 Park 4834
(See advertisement page 128)
Crain Pump & Lumber Co. 17 N. 7th St.
Market 3210 Main 9184
Ford Tank Co. .....200 E. Tabor Rd.
Michigan 6499
Schlichter, E. F., Co. ....10 S. 18th St.
Locust 1875 Race 4503
Warren Tank Co. .....1113 Cherry St.
Walnut 1919
Woolford, G., Wood Tank Mfg. Co.
Darby
Woodland 1047 Darby 78

TELEPHONE ENGINEERS SPECIFICATIONS

Bell Telephone Co. ..Engineering Dept.
Official 0050
(See advertisement page 4)

TEMPERATURE REGULATORS

(See Regulators—Heat Regulators)

TERRA COTTA—ARCHITECTURAL TERRA COTTA

Metcham, O. W. .....125 N. 18th St.
Rittenhouse 7672
(See advertisement page 18)
Atlantic Terra Cotta Co. .....Otis Bldg.
Rittenhouse 7039
Clausen, Wm. H. ..27th & Diamond Sts.
Columbia 6526 Park 4981
Conkling-Armstrong Terra Cotta Co.
Insurance Co. of N. America Bldg.
Rittenhouse 9559 Race 7653
Federal Terra Cotta Co. .....Otis Bldg.
Rittenhouse 7571 Race 7639
Lukens, J. Parry .....Liberty Bldg.
Rittenhouse 3209
West Phila. Tile Co. .....6045 Vine St.
Granite 5283

TERRA COTTA—HOLLOW TILE

(See Tile—Hollow Tile)

TERRA COTTA—WALL COPING

(See Wall Coping—Terra Cotta)

TERRAZZO

Belfi Bros., & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Wilson, Wm. G. .....2313 Walnut St.
Rittenhouse 7564
Di Sopra, John .....Land Title Bldg.
Rittenhouse 0130 Race 2602

TEST BORINGS

(See Drilling—Test Drilling)

THERMOFLECTORS

Gerken, Co., The J. D. ...Jefferson Bldg.
Walnut 0686
(See advertisement page 119)

THRESHOLDS—EXTRUDED BRONZE THRESHOLDS—PLAIN AND CORRUGATED

Shannon Metalcraft Corp. .11 Letitia St.
Walnut 2396
(See advertisement page 74)

TIE RODS AND TRUSS RODS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

TIE—ART TILE

Belfi Bros., & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Lo Monaco Bros. Tile Co.
7119 Torresdale Ave.
Tacony 1474

TILE ASBESTOS—CONCRETE TILE

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

TILE—BATH ROOM TILE

Belfi Bros., & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Covenant Tile Co. ..836 E. Belgrade St.
Regent 2943
Lorenzon, Italico ...9 E. Moreland Ave.
Chestnut Hill 1612
Caccese Tile Mosaic Co.
4973 Lancaster Ave.
Belmont 3320 West 2480

TILE—FLOOR TILE

Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)
Belfi Bros. & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Hood Tile Co. ....13th & Chestnut Sts.
Pennypacker 7620 Race 0018
Manning, E. Seymour ....748 N. 40th St.
Baring 7901
West Phila. Tile Co. .....6045 Vine St.
Granite 5283

TILE—FLOOR TILE—CORK FLOOR TILE

Cork Import Corp. ....1524 Chestnut St.
Rittenhouse 5917
Kennedy, David E., Inc.
Real Estate Trust Bldg.
Pennypacker 2851 Race 2658
Livezey, John R.
Glenwood Ave. W. 22d St.
Diamond 4003 Park 2074
United Cork Cos. .....1042 Ridge Ave.
Poplar 0158 Race 4641

TILE—HOLLOW TILE

Ketcham, O. W. .....121 N. 18th St.
Rittenhouse 7672 Race 6226
(See advertisement page 18)
Cambria Clay Co. .....1700 Walnut St.
Pennypacker 2846
Cox, Janeway, & Co. ..Rl. Est. Tr. Bldg.
Pennypacker 0496 Race 7003
National Fireproofing Co.
Land Title Bldg.
Rittenhouse 4761 Race 2778
Pardee, John S. E. ..7048 Schuylkill Ave.
Locust 5725 Race 5035
Pittsburgh Clay Products Co.
2313 Walnut St.
Rittenhouse 3615
Robinson, Thos., & Co.
Real Estate Trust Bldg.
Pennypacker 8161 Race 4545
Stokes, The Tile Man
Transportation Bldg.
Rittenhouse 4840
Wilkes-Barre Clay Products Co.
126 N. 18th St.
Rittenhouse 6664 Race 9547

TILE—HOLLOW BUILDING TILE

Pittsburgh Clay Products Co.
2315 Walnut St.
Rittenhouse 3615

TILE—MOSAIC TILE

Atlantic Tile & Mosaic Co.
Upper Darby, Pa.
Allegheny 2794
Belfi Bros. & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Caccese Tile Mosaic Co.
4973 Lancaster Ave.
Belmont 3320 West 2480

TILE—MOSAIC TILE—Continued

Phila. Tile & Mosaic Co.
148 E. Willow Grove Ave.
Chestnut Hill 1141
Chestnut Hill Tile & Mosaic Co.
9 E. Moreland Ave.
Chestnut Hill 1612
Di Sopra, John .....Land Title Bldg.
Rittenhouse 0130 Race 2602
Franklin Tile & Mosaic Co.
1344 Ellsworth St.
Oregon 4568
Italian Marble Mosaic Co.
433 Spruce St.
Lombard 2988 Main 8140
Novelty Tile and Mosaic Co.
1314 Passyunk Ave.
Oregon 2347

TILE—ROOFING TILE

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Ketcham, O. W. .....125 N. 18th St.
Rittenhouse 7672 Race 6226
(See advertisement page 18)
Henry, E. P., Co. ....9th & Oxford Sts.
Columbia 6706 Park 4198
(See advertisement page 28)
American Cement Tile Mfg. Co.
1827 Arch St.
Rittenhouse 5556
Moore, Wm., Co. .....1516 Sansom St.
Rittenhouse 7661 Race 5351
Murray Roofing Tile Co.
2315 Walnut St.
Rittenhouse 7149 Race 3615
Reid, A. S., & Co. .....1615 Spruce St.
Spruce 6631 Park 3053
Rosse Clay Products Corp.
2315 Walnut St.
Rittenhouse 3615 Race 7149

TILE—RUBBER TILE

American Tile & Rubber Co.
313 Vine St.
Market 5066
Bonded Floors Co., Inc. ..Morris Bldg.
Rittenhouse 0340
Federal Floor Co. ....1344 Ellsworth St.
Jackson 0146

TILE—WALL TILE

Atlantic Tile & Mosaic Co.
Upper Darby, Pa.
Allegheny 2794

TILE—WALL TILE—Continued

Belfi Bros. & Co. .....1923 Market St.
Rittenhouse 4559 Race 1114
Chestnut Hill Tile & Mosaic Co.
9 E. Moreland Ave.
Chestnut Hill 1612
Gibson, Thos. M. .....1802 N. 56th St.
Woodland 7019
Di Sopra, John .....Land Title Bldg.
Rittenhouse 0130 Race 2602
Manning, E. Seymour ....748 N. 40th St.
Baring 7901
Sani Const. Co., Inc. .....467 N. 8th St.
Market 6526
Standard Wall Covering Co.
1819 N. 9th St.
Columbia 3669 Park 1628
Embossed Wall Covering Co.
1215 Belmont Ave.
Belmont 6260
Franklin Tile & Mosaic Co.
1344 Ellsworth St.
Oregon 4568
Novelty Tile & Mosaic Co.
1314 Passyunk Ave.
Oregon 2347

TILE LAYING—INTERIOR & EXTERIOR TILE & MARBLE WORK

Artisans Tile & Marble Works
2611 Wharton St.
Jackson 3780

TIN PLATE

Acme Tin Plate & Roofing Supply Co.
2401 N. 10th St.
Diamond 8530 Park 1629
Berger Bros. Co. .....229 Arch St.
Market 1551 Main 4066
Carter, Donlevy, & Co. ..1012 Cherry St.
Walnut 5990 Race 3548
Fable & Co., Inc. .....510 N. 3d St.
Market 3002 Main 9067
Knoedler, Fredk. J., Co. ....68 N. 2d St.
Market 3775 Main 7672
Merchant & Evans Co., genl. ofcs.
2035 Washington Ave.
Oregon 7900 Race 4821
Riter Bros. & Co., Inc. ....1022 Race St.
Walnut 2226 Race 4309
Taylor, N. & G., Co.
Liberty Trust Bldg.
Rittenhouse 7579 Race 6611
Washington Tinplate Co.
Commercial Trust Bldg.
Rittenhouse 2510

TINNERS

Dillman, Wm. .....5551 Boyer St.
Germantown 9150
Fitter, Wm. .....1821 N. Marshall St.
Columbia 4735
Hand, Edw. C. .....4430 Ludlow St.
Evergreen 1374
Hanlon, Edw. F. .....5501 Chew St.
Germantown 7654
Jacobus, Harry .....90 E. Haines St.
Germantown 0338
Karthauser, Herman .....500 Rhawn St.
Fox Chase 0795
Krasnoff, Nathan .....957 N. 2d St.
Market 4994
Penna. Copper works ....1617 N. 4th St.
Columbia 8274
Weiner Bros. .....1028 Shunk St.
Oregon 6836

TITLE SEARCHER

Matz, E. Russell, ...Widener Bldg.
Rittenhouse 9619

TOILET PARTITIONS

(See Partitions—Toilet)

TOILET SEATS

Brunswick-Balke-Collender Co.
40 N. 6th St.
Lombard 8440 Main 8773

TORCHES—OIL TORCHES

(See Contractors' Equipment)

TORCHES—ELECTRIC TORCHES

(See Contractors' Equipment)

TOWERS—STEEL TOWERS

Van Duser, A. B. ...638 W. Girard Ave.
Market 4893

TRACTORS

Baker-Raulang Co. .....18 S. 15th St.
Rittenhouse 7055
Beckwith Machinery Co.
N. E. Cor. Front & Brown Sts.
Market 2735
Clark Tructractor Co. ..Widener Bldg.
Rittenhouse 0922

TRACTORS—Continued

Daly, John F. .....510 Pine St.
Lombard 8034 Main 2544
Holt Mfg. Co. .....Front & Brown Sts.
Market 2735
International Harvester Co. of America
2905 N. 16th St.
Tioga 4791 Park 2789
Mercury Mfg. Co. .....5900 Spruce St.
Sherwood 7073
Monarch Tractors Corp.
3131 Powelton Ave.
Evergreen 1366 West 2441

TRAILERS

Highway Trailer Co. of Phila.
4831 Lancaster Ave.
Belmont 7695
Mercury Mfg. Co. .....5900 Spruce St.
Sherwood 7073

TRAPS—ACID RESISTANT TRAPS

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

TRAPS—BACK WATER TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—BATH TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—BELL TRAPS—IRON & STEEL

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—DEEP SEAL TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—DURHAM "P" TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—GREASE TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—SHOWER TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—SINK TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRAPS—URINAL TRAPS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

TRUCKS—MOTOR TRUCKS

(See Motor Trucks)

TRUMBULL VANDERPOOL SWITCHES

Trumbull Elec. Mfg. Co. ...Bourse Bldg.
Lombard 9300 Main 9351

TUBES—BOILER TUBES

Astell & Co., John B.
Chestnut & 31st Sts.
Evergreen 1360 West 4911
Baily, R. M., Co. .....Comrcl. Tr. Bldg.
Rittenhouse 2510
Laub, W. A., Co. .....1700 Walnut St.
Pennypacker 4747
Morris, Wheeler, & Co., Inc.
30th & Locust Sts.
Evergreen 5900 West 1601

TUBES—BOILER TUBES—Contiuued

Phila. Boiler Works ....1737 Filbert St.
Rittenhouse 3854
Reading Iron Co. .....Drexel Bldg.
Lombard 0617 Main 1182

TUBES—BRASS TUBES

American Brass Co. .....Widener Bldg.
Rittenhouse 2571
American Tube Works ....Bourse Bldg.
Lombard 0751 Main 1855
Hillman, H. M. .....209 S. Front St.
Lombard 1941

TUBES—COPPER TUBES

American Brass Co. .....Widener Bldg.
Rittenhouse 2571
American Tube Works ....Bourse Bldg.
Lombard 0751 Main 1855
Hillman, H. M. .....209 S. Front St.
Lombard 1941

TUBES—STEEL TUBES

Baily, R. M., Co. .....Comrcl. Tr. Bldg.
Rittenhouse 2510
Delaware Seamless Tube Co.
1418 Walnut St.
Pennypacker 6432
Frasse, Peter A., & Co., Inc.
3715 Wissahickon Ave.
Tioga 5550 Park 5541

UPSON WALLBOARD

Smedley Bros. Co.
Church & Tacony Sts., Frankford
Jefferson 7120 East 7745

URINAL TRAPS & DRAIN HEADS

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

VACUUM CLEANERS—STATIONERY VACUUM CLEANERS

Emery, Chas. W., & Son
1304 Diamond St.
Stevenson 0621
United Electric Co. ..1304 Diamond St.
Stevenson 0621
Connersville Vacuum Cleaners
Allison, C. L., Co. .....1611 Sansom St.
Rittenhouse 6329

VACUUM HEATING

(See Heaters—Vacuum Heaters)

VALVES—AIR VALVES

Simplex Valve & Meter Co.
68th St. & Upland Ave.
Woodland 9214

VALVES—ALTITUDE VALVES

Simplex Valve & Meter Co.
68th St. & Upland Ave.
Woodland 9214

VALVES—AUTOMATIC STOP VALVES

Ludeman Bros., Inc. .....Drexel Bldg.
Lombard 1555

VALVES—BACK WATER VALVES

Boosey, Norman, Mfg. Co.
5140 Hamilton Ave., Detroit, Mich.
(No Philadelphia Office)
(See advertisement page 70)

VALVES—BLOW OFF VALVES

Eckenroth Valve & Mfg. Co.
20th St. & Allegheny Ave.
Tioga 4661
Homestead Valves Agency..810 Race St.
Walnut 6791 Main 9147

VALVES—CAST STEEL VALVES

Grant, Chas. J. .....22d & Somerset Sts.
Columbia 4911 Park 4868

VALVES—CHECK VALVES

Smolensky Valve Co. .....20 S. 15th St.
Rittenhouse 6052 Race 2684

VALVES—COMPRESSION VALVES

Ruwell, Wm. F. .....719 Noble St.
Market 0902 Main 2136

VALVES—HYDRAULIC OPERATED VALVES

Homestead Valves Agency..810 Race St.
Walnut 6791 Main 9147
Wood, R. D., & Co. ....400 Chestnut St.
Lombard 1020 Main 5731

VALVES—PRESSURE REDUCING VALVES

Leslie Co. .....560 N. 16th St.
Poplar 0747
Mason Regulator Co......133 N. 7th St.
Market 3040
Watson & McDaniel Co. ..146 N. 7th St.
Market 1889 Main 1954

VALVES—STEAM VALVES

Koons, E. W., & Co. ....911 Filbert St.
Walnut 1927 Race 1631
Walworth Co. .....245 Arch St.
Market 2055 Main 8741
Chapman Valve Mfg. Co. ..1019 Arch St.
Walnut 1057

VALVES—WATER VALVES

Walworth Co. .....245 Arch St.
Market 2055 Main 8741
Wood, R. D., & Co. ....400 Chestnut St.
Lombard 1020 Main 5731

VAPOR HEATERS
(See Heaters—Vapor Heaters)

VATS

Roth, Ernest
424 Laurel Ave., Cheltenham
Fox Chase 1361

VAULTS

Bank Vault Inspection Co.
1824 Ludlow St.
Rittenhouse 7480 Race 9579
Consolidated Expanded Metal Cos.
1083 Germantown Ave.
Market 1468
Remington & Sherman Co.
1545 N. Delaware Ave.
Regent 7626

VAULT DOORS
(See Doors—Vault Doors)

VAULT LIGHTS

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
American Barlock Co. ..2500 Duncan St.
Delaware 4995

VENEERS

Appleton, Lawrence, & Co.
218 Walnut St.
Lombard 3163 Main 5829
Hall, Fessenden .....218 S. 2d St.
Lombard 2380 Main 3684
Indiana Veneer & Panel Co.
Bulletin Bldg.
Locust 2658
Miller, H. C. L., Inc. ..1109 N. Front St.
Regent 1100 Park 2345
Thompson, Lewis, & Co., Inc.
Margaret St. & Penna. R. R.
Delaware 1230

VENETIAN BLINDS

Burlington Venetian Blind Co.
112 N. Broad St.
Rittenhouse 9368
Swayne, Jos. J. .....1136 S. 60th St.
Allegheny 3436
Wilson, J. G., Corp. ....1700 Walnut St.
Pennypacker 4360
Swedish Venetian Blind Co.
1802 Chestnut St.
Rittenhouse 1933

VENTILATING BLOWERS

Murdoch, John P. ..30th & Oakford Sts.
Jackson 4232

VENTILATING FLUES—ACID RESISTANT VENTILATING FLUES

Knight, Maurice A. .....1228 Spruce St.
Pennypacker 6983
(See advertisement page 70)

VENTILATION EQUIPMENT

American Sheet Metal Works
6350 Greenway Ave.
Woodland 0801
Arctic Nu-Air .....1237 Vine St.
Locust 4645
Autovent Fan & Blower Co.
2401 Chestnut St.
Rittenhouse 9840

VENTILATORS—ROOF VENTILATORS

Call, John, Co. ..122-128 N. Franklin St.
Market 4969 Main 3174
English & Co., Inc.
259 N. Lawrence St.
Market 0313
Merchant & Evans Co.
2035 Washington Ave.
Oregon 7900 Race 4821
Reliance Engineering Co.
1524 Chestnut St.
Rittenhouse 4680
Robertson, H. H., Co. .Rl. Est. Tr. Bldg.
Pennypacker 0582
Iona Ventilator Co...2821 W. Dauphin St.
Diamond 2619 Park 3589

VENTILATORS—ROTARY VENTILATORS

Swartwout Co. .....Drexel Bldg.
Lombard 9475

VENTILATORS—WINDOW VENTILATORS

Bohem Mfg. Co. .18th St. & Wash. Ave.
Oregon 0463
Wurldbest Ventilator Co...102 N. 5th St.
Lombard 7290 Main 4660

VITRIFIED BRICK

(See Brick—Vitrified Brick)

WAINWRIGHT CURB BAR

Steel Protected Concrete Co.
1622 Real Estate Trust Bldg.
Pennypacker 3683

WALL BOARD

Cornell Wall Board Agency
63d St. & Woodland Ave.
Woodland 4575
Gurevitch, Chas., & Sons
2421 Washington Ave.
Oregon 9591

WALL BOARD—ASBESTOS WALL BOARD

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Carey, Philip, Co.
24th St. & Sedgley Ave.
Columbia 6430
(See advertisement page 10)
Krewson Asbestos Co. ..542 N. 54th St.
Belmont 1942 West 3080
(See advertisement page 22)

WALL BOARD—CELOTEX WALL BOARD

Gillingham Co., The
Morris & Richmond Sts.
Regent 8450 East 7975
(See advertisement page 30)

WALL BOARD—COMPO BOARD

Ketcham, Howard ..330 W. Girard Ave.
Market 3448 Park 1137

WALL BOARD—FIREPROOF WALL BOARD

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)
Allen, Ellwood M., Lumber Co.
Trenton Ave. & Ann St.
Regent 1150 East 7761
Clothier Lumber Co.
Ruan & Leiper Sts.
Jefferson 6732 East 8962
Felin, Chas. F., & Co., Inc.
Old York Rd. ab. Butler St.
Michigan 3150 North 0601
Frost, Wm. M., & Co.
Welsh Rd. N. Montague St.
Holmesburg 1126
Kearney Lumber Co.
2569 Grays Ferry Ave.
Jackson 0604 Race 4373
Nass, George, & Son
Glenwood Ave. & Dauphin Sts.
Columbia 8022 Park 3971

WALL BOARD—FIREPROOF WALL BOARD—Continued

Pearce Fireproof Co. ....1911 N. 2d St.
Regent 9840
Black Rock Wall Board ..1505 N. 5th St.
Columbia 6566

WALL BOARD—LINABESTOS FIREPROOF WALL BOARD

Asbestos Shingle, Slate & Sheathing Co.
1001 Liberty Trust Bldg.
Rittenhouse 5253
(See advertisement page 64)

WALL BOARD—SHEET ROCK

Gottshall & Morgan Co.
7th & Main Sts., Darby
Darby 132-W

WALL BOARD—UPSON WALL BOARD

Smedley Bros. Co.
Church & Tacony Sts.
Jefferson 7120 East 7745

WALL FINISHES

Crafts Decorating Co.
521 Land Title Bldg.
Rittenhouse 4440 Race 3431
(See advertisement page 146)
Arvon Co. .....1816 Ludlow St.
Rittenhouse 8363 Race 6150

WALL PAPER

Asam Bros. .....919 Arch St.
Walnut 5460 Race 7824
Same .....5542 Chestnut St.
Allegheny 0785 West 1994
Same .....2446 Germantown Ave.
Columbia 1301 Park 7185
Becker, Smith & Page, Inc.
Water St. & Snyder Ave.
Oregon 1470 Main 7711
Hodgson, Frank H.
54th & Chestnut Sts.
Allegheny 3038 West 2491
Hodgson, Frank H. .....1903 Gtn. Ave.
Diamond 7861 Park 4050

WALL PAPER—Continued

Lindsay, John, & Sons Co. 122 N. 11th St.
Walnut 3643 Race 9876
Pan-American Wall Paper & Paint Co.
905 Arch St.
Walnut 2090 Race 1132
Phila. Wall Paper Co. ....1204 Arch St.
Spruce 9181 Race 7957
Schultz, D. .....757 Passyunk Ave.
Lombard 2895

WALL PAPER HANGING

Addison & Co. .....5255 Chestnut St.
Allegheny 2927
Allen, A. M., Co.
1626 W. Wingohocking St.
Wyoming 6748
Amlung & Doherty..5209 Larchwood St.
Allegheny 2617
Balis Bros. .....1614 Ridge Ave.
Poplar 5643 Race 3866
Beck's, T. J., Sons Co...1416 W. Tioga St.
Tioga 5668
Boyd, John C. .....5502 Whitby Ave.
Allegheny 1119
Breedings' Sons, B. P...619 Chelten Ave.
Waverly 1020
Brenner, Manuel ...2987 Frankford Ave.
Regent 6280
Foster, Edgar H., & Son
1920 Fitzwater St.
Locust 2123
Ideal Decorating Co.
8th St. & Wyoming Ave.
Wyoming 3341
Kayser & Allman ....1522 Chestnut St.
Rittenhouse 5552 Race 4064
Kennedy, F. X., & Co. ..6201 Walnut St.
Allegheny 1067
King, Carl C. .....6621 Musgrave St.
Germantown 8623
King, Frederick W. ...1925 N. Broad St.
Stevenson 6742
Kooperman & Sons, Inc.
29th & Poplar Sts.
Poplar 0657 Race 9676
Mannices, Wm. .....3510 N. Front St.
Garfield 2162
Riggins, George W. .....3408 N. 5th St.
Regent 5571
Schairer, Edmund .....2927 N. 22d St.
Columbia 6131
Wayne Decorating Co.
4915 Wayne Ave.
Germantown 6007

WALL PAPER HANGING—Continued

West Phila. Decorating Co.
104 N. 60th St.
Granite 3058 West 2325
Drayton, George H. ..6315 Limekiln Pk.
Waverly 3291

WALL PLASTER

(See Plaster)

WARM AIR HEATERS

(See Heaters—Warm Air Heaters)

WASHERS

Atlas Iron & Steel Co.
1536 N. Delaware Ave.
Regent 0890 East 8959
(See advertisement page 36)

WATER HEATERS—COAL FIRED WATER HEATERS

(See Heaters—Water Heaters—Coal Fired)

WATER HEATERS—GAS FIRED

(See Heaters—Water Heaters—Gas Fired)

WATER HEATERS—INSTANTANEOUS WATER HEATERS

(See Heaters—Water Heaters—Instantaneous Water Heaters)

WATER METERS

(See Meters—Water Meters)

WATER SUPPLY SYSTEMS

Fleck Bros Co., Inc .....50 N. 5th St.
Lombard 9140 Main 8801
(See advertisement page 74)
Crane Co. .....212 S. 13th St.
Pennypacker 1250 Race 4463
Ft. Wayne Engineering & Mfg. Co.
40 N. 7th St.
Lombard 7879
Harrison Mertz & Emlen Inc.
1713 Sansom St.
Rittenhouse 7244 Race 7645
National Utilities Co. .....623 Arch St.
Market 3210

WATERPROOFING

Rulon, Ralph V., Inc.
Hunting Park Ave. at E. St.
(See advertisement page 142)
Carson Waterproofing Co.
1700 Walnut St.
Pennypacker 9265 Race 5148
(See advertisement page 146)
Christensen, Adolph ....1433 Brown St.
Poplar 0153
(See advertisement page 142)
Hydroseal Waterproofing Co.
829-35 N. 3d St.
Market 4525
(See advertisement page 101)
Anti-Hydro Waterproofing Co.
265 Badger Ave., Newark, N. J.
Cope & Co. .....620 S. Delaware Ave.
Lombard 7021
Aquabar Co. .....Perry Bldg.
Rittenhouse 7012
Builders' Specialty Co. 1844 N. Front St.
Regent 5911 Park 1373
Ceresit Waterproofing Co.
1209 N. Taney St.
Poplar 2118
Hydro-Bar Corp. .....The Bourse
Lombard 9300
Seal-A-Void Co. .....1126 S. 11th St.
Jackson 4809
Weather-Proof Caulking Co.
2417 Fitzgerald St.
Jackson 0570

WATERPROOFING—ASPHALT—MASTIC WATERPROOFING

Rulon, Ralph V., Inc.
Hunting Park Ave. at E. St.
Bell Phone
(See advertisement page 142)

WATERPROOFING—IRON CEMENT COATING

Clancy, James A. .....Harrison Bldg.
Spruce 7791

WATERPROOFING & DAMPPROOFING—FELT CLOTH & FABRIC WATERPROOFING & DAMPPROOFING

Rulon, Ralph V., Inc
Hunting Park Ave. at E. St.
Bell Phone
(See advertisement page 142)

WATERPROOFING & DAMPPROOFING—PAINTS & COMPOUNDS

Rulon, Ralph V., Inc
Hunting Park Ave. at E. St.
Bell Phone
(See advertisement page 142)

WEATHERSTRIPPING—METAL WEATHERSTRIPPING

A. B. C. Metal Weatherstripping Co. 6202 Germantown Ave.
Germantown 4630
Ace Home Improvement Co. 3256 N. 5th St.
Regent 8011
American Metal Weatherstrip Co. 2118 Diamond St.
Columbia 2300
Colombe & Peters ....1603 Orthodox St.
Delaware 4965
Cincinnati Fly Screen Co. 23 S. 52d St.
Sherwood 0768
Duer, F. L. .....1615 Sansom St.
Rittenhouse 1761
Durell, E. Clifford .....1713 N. 24th St.
Stevenson 6247
Field Mfg. Co. .....5335 Florence Ave.
Woodland 4921
Geier, John ....Broad & Courtland Sts.
Wyoming 9333
Higgin Metal Weatherstrip Co. Lincoln Bldg.
Rittenhouse 2795 Race 1028
Horworth, John .....4111 N. 5th St.
Michigan 7215
Jackson Screen Co. ..10th & Tioga Sts.
Tioga 8320 Park 2375
Kane Mfg. Co. ....3312 Lancaster Ave.
Evergreen 1399
Otto, A. L. Co. ..1114 N. Delaware Ave.
Regent 0310
Porch Enclosures Screens & Weatherstrip Co. .....West End Trust Bldg.
Rittenhouse 2383
Quaker City Metal Weatherstrip Co. 2017 S. 63d St.
Woodland 3682
Quay Company .....3020 N. 26th St.
Columbia 2420
Sager Metal Weatherstrip Co. 16th & Race Sts.
Rittenhouse 1721
Tull & Torchio, Inc. 732 N. Harmony St.
Evergreen 3750
Van Sant, Clarence W. 1915 Orthodox St.
Jefferson 5878

WEATHERSTRIPPING—METAL WEATHERSTRIPPING—Continued

Wolfe & Adams .....Land Title Bldg.
Rittenhouse 3953
American Metal Weatherstrip Co. 2118 Diamond St.
Columbia 2300
Cardwell, S. H. ....636 E. Locust Ave.
Victory 6961
Orsco Metal Weatherstrip Co. 4612 Walnut St.
Evergreen 3467

WEATHERVANES

Henis, W. G. Sons & Co. 1347 Ridge Ave.
Poplar 2079 Race 1360

WELDING ENGINEERS

(See Engineers—Welding Engineers)

WELDING—ACETYLENE WELDING

Albion Welding Co. ...4127 Worrell St.
Jefferson 4848
Burchill, D. J.
Rear 30 N. 6th St. (614 Discount Place)
Lombard 7822 Main 6876
Electric Welding Service Co. 4100 Paul St.
Jefferson 1056 East 8169
K. & K. Welding Co. ....453 N. 12th St.
Poplar 4978
National Electric Welding Co. 1612 Wood St.
Rittenhouse 6439 Race 1147
Universal Welding Co. 1320 Mt. Vernon St.
Poplar 3943
Welding Engineers .....225 S. 15th St.
Pennypacker 2586

WELDING—ELECTRIC WELDING

Electric Welding Process Co. 2327 Pierce St.
Oregon 3786
(See advertisement page 128)
A. E. Welding Service 2039-41 E. Willard St.
Regent 9997
Buckeye Welding Co. 2814 Richmond St.
Nebraska 9156
Emergency Welding Service 122 Lombard St.
Lombard 7263 Main 2731

WELDING—ELECTRIC WELDING—Continued

Electric Welding Serv. Co. 4100 Paul St.
Jefferson 1056 East 8169
Hofmann, Otto U. ..3d above Cayuga St.
Michigan 2240
Keystone Welding & Engineering Co.
Front & Walnut Sts.
Lombard 0484
Lees Electric Welding Co. 117 Walnut St.
Lombard 4677 Main 5151
Night Call Collingswood 304 or 1507
Monument Welding Co. ..1436 Norris St.
Stevenson 0552
National Elec. Welding Co.
1612 Wood St.
Rittenhouse 6439 Main 6730
Penna. Elec. Welding Co., Inc.
416 Vine St.
Market 2831 Main 6934
Standard Elec. Welding Co.
1941 E. Sergeant St.
Regent 0240
Tioga Engineering & Pattern Co., Inc.
7th & Ontario Sts.
Tioga 5779
Welding Engineers, Inc. ..225 S. 15th St.
Pennypacker 2586

WELDING MACHINERY—ELECTRIC WELDING MACHINERY

Burke Electric Co. .....1600 Arch St.
Rittenhouse 5226 Race 3479
(See advertisement page 169)

WELL DRILLING—ARTESIAN WELL DRILLING

Artesian Well Drilling Co.
Aramingo & Girard Ave.
Regent 1318 East 7042
Ridpath & Potter Co. 22d & Cambria Sts.
Columbia 6397 Park 3414
Nicholas, Andrew J. & Co.
2208 N. 26th St.
Columbia 5801 Park 2128
Quinn & Herron 2609 W. Allegheny Ave.
Tioga 3813
Rulon, John B. .....1355 Colwyn St.
Wyoming 3499

WELL TESTING—COMPRESSED AIR WELL TESTING

Compressed Air Service Corp.
Jefferson Bldg.
Walnut 6488 Race 3401
(See advertisement page 78)

WILKES-BARRE CLAY PRODUCTS

Face Brick, Smooth, Rough, Tex and Salt Glazed; Hollow Clay Tile
Wilkes-Barre Clay Products Co.
126 N. 18th St.
Rittenhouse 6664 Race 9547

WINDOW FRAMES

(See Millwork)

WINDOW GLASS

(See Glass—Window Glass)

WINCHES—POWER WINCHES

Mead-Morrison Mfg. Co. East Boston Mass. .....9th & Jefferson Sts.
Stevenson 4180
Rodenhausen Sales & Serv. Co.
9th & Jefferson Sts.
Stevenson 4180
Shepard Elec. Crane & Hoist Co.
City Centre Bldg.
Locust 7913 Race 9588

WINDOW SHADES

Burlington Venetian Blind Co.
Fidelity Trust Bldg.
Rittenhouse 9368
De Frehn, Ralph ....3123 Frankford Ave.
Regent 9871
De Frehn & Sons, S. T.
2036 Frankford Ave.
Regent 4398-4399
Duffy, Edw. A. .....5148 Walnut St.
Sherwood 5860
Landgrebe, B. J.
635 W. Hunting Park Ave.
Michigan 3937
Miller Bros .....1805 E. Passyunk Ave.
Jackson 5866
Newman, J. .....4535 N. 5th St.
Michigan 7259
Reinhart, Jos. & Sons, Inc.
1627 E. Passyunk Ave.
Jackson 0482 Race 0076
Restorff, A. V. .....2626 N. 22d St.
Columbia 8716
Thiel, Max .....832 N. Broad St.
Poplar 1462
Van Sciver, J. B. Co. ....Camden N. J.
Lombard 6200
American Window Shade & Linoleum Co.
60th St. & Hazel Ave.
Sherwood 1715
Jones, Wm. L. .....2333 N. 10th St.
Columbia 5543

WINDOWS—BULK WINDOWS

Brosz, Paul ....2515 W. Huntingdon St.
Columbia 0842 Park 2326
Claitman, M. .....309 Reed St.
Lombard 4251
Epstein, Harry & Co., Inc.
912 S. Front St.
Lombard 7987
Arrigale, Lawrence & Son
14 W. Thompson St.
Regent 4371
Maurer, J. & Co. .....910 N. Front St.
Market 4274
Penn Cabinet Co. .....213 S. Jessup St.
Pennypacker 6408
Rust, Harry R., Inc. ....724 Ludlow St.
Lombard 6877 Main 4297
Weiss, Geo. Co. ....701 E. Girard Ave.
Regent 6497 East 8988

WINDOWS—CASEMENT WINDOWS—STEEL CASEMENT WINDOWS

Gassner, Thomas S. Co. 4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)
Wilson, F. J. Co. .....1600 Walnut St.
Pennypacker 1488 Race 1968
(See advertisement page 118)
Crittall Casement Window Co.
Harrison Bldg.
Clancy, James A., Sales Agent
Spruce 7791
Nichols, Louis F. Co. ....Flanders Bldg.
Spruce 1282 Race 6070
Wilson, F. J. Co. .....1600 Walnut St.
Rittenhouse 5717 Race 1968

WINDOWS—COAL WINDOWS

Steel & Wike Co. .....533 N. 13th St.
Poplar 6621 Race 6416
(See advertisement page 118)

WINDOWS—HOLLOW METAL WINDOWS

Phila. Fire Retardant Co. ..1321 Arch St.
Rittenhouse 7538 Race 7036
(See advertisement page 108)

WINDOWS—UNDERWRITERS' DOUBLE HUNG STEEL WINDOWS

Gassner, Thomas S. Co. 4545 Wayne Ave.
Michigan 7400 North 0165
(See advertisement page 248)

WIRE—BRASS WIRE

American Brass Co. .....Widener Bldg.
Rittenhouse 2571

WIRE—COPPER WIRE

American Brass Co. .....Widener Bldg.
Rittenhouse 2571
Simplex Wire & Cable Co.
Real Estate Trust Bldg.
Pennypacker 1287 Race 2691
Universal Light Co. .....227 Church St.
Market 0853 Main 2102

WIRE—WELDING WIRE

Hascik Wire Works 319 N. Marshall St.
Market 1451

WIRE CLOTH

Latimer, Robt. L. & Co. 24 N. Front St.
Market 0335 Main 5621
New Jersey Wire Cloth Co.
223 Arch St.
Market 2751 Main 6532

WIRE GLASS

(See Glass—Wire Glass)

WIRE GRILLES

New Jersey Wire Cloth Co.
223 Arch St.
Market 2751 Main 6532

WIRE LATH

New Jersey Wire Cloth Co.
223 Arch St.
Market 2751 Main 6532

WIRE PARTITIONS

(See Partitions—Wire Partitions)

WIRE ROPE

(See Cable—Steel Cable)

WIRE SCREENS

(See Screens—Wire Screens)

WIRE WORK

Associated Iron Works ..1233 Arch St.
Locust 3047 Race 4325
(See advertisement page 36)
American Wire Works ..404 Addison St.
Lombard 3318
Bush, Jos. & Co. .....427 Wood St.
Market 1971 Main 3068
Darby, Edw. J. & Son ...338 Brown St.
Market 5465 Park 5004
Phila. Wire & Ornamental Iron Works
Clarion & Federal Sts.
Oregon 8264
Biggin, Chas. P., Co. ....1829 Harlan St.
Poplar 1877 Park 4711

WIRE WORK—TELEPHONE WIRE WORK

Bell Telephone Co. ...Engineering Dept.
Official 0050

WOOD BLOCKS

(See Paving—Wood Block Paving)

WOOD PRESERVATIVES

Atlantic Creosoting Co., Inc.
Widener Bldg.
Rittenhouse 0963
Gulf States Creosoting Co.
Bankers Trust Bldg.
Pennypacker 4638
Hicks-Cobley Co., Inc. Land Title Bldg.
Rittenhouse 1785
Jennison Wright Co. .....Crozer Bldg.
Rittenhouse 8469
Keystone Wood Preserving Co.
226 S. 15th St.
Pennypacker 7386
Republic Creosoting Co.
City Centre Bldg.
Locust 0513
Southern Wood Preserving Co.
Land Title Bldg.
Rittenhouse 1785

WOOD TANKS

(See Tanks—Wood Tanks)

WOODWORK—INTERIOR WOODWORK

(See Millwork)

WOODWORKING MACHINERY

Seyferts' L. F. Sons .....437 N. 3d St.
Market 0758 Main 4330

WRECKING BUSINESS—DEMOLITIONS

Compressed Air Service Corp.
1015 Chestnut St.
Walnut 6488
(See advertisement page 78)

WRECKING—HOUSE WRECKING

Franklin House Wrecking Co.
3301 Germantown Ave.
Tioga 5168
Klinges, George Co.
33d & Fairmount Ave.
Evergreen 5832 West 1481
Pantano House Wrecking Co.
1216 S. 24th St.
Oregon 0804 Race 9832
Provident House Wrecking Co.
133 Greenwich St.
Oregon 9700
Sorrentino, Michael ....921 Catharine St.
Pennypacker 0798
Thompson, L. B. .....706 S. 11th St.
Pennypacker 4485

WROUGHT IRON PIPE

(See Pipe—Wrought Iron Pipe)

ZINC—PLATES—ZINC

Hillman, H. M. .....209 S. Front St.

ZINC—SHEET ZINC

Berger, L. D., Co. .....59 N. 2d St.
Market 0555 Main 8714
Riter Bros & Co., Inc. ...1022 Race St.
Walnut 2226

CARDINELL'S

SINGLE FLUID

Harmless to Hands and Fabrics.

LEAVES NO STAIN

Removes Ink, Iodine, Fruit, and other Stains

FASTER-SURER-BETTER

Sold by Dealers everywhere
If your dealer cannot supply it
send 25c for trial bottle to

CARDINELL-INKOUT MFG. CO.
MONTCLAIR, N. J.

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